MARYLAND HISTORICAL TRUST
NR-ELIGIBILITY REVIEW FORM

NR Eligible: yes ___
no X

Property Name: U.S. Army Ordnance Assembly Plant Inventory Number: HA-2049

Address: Edgewood Area, Aberdeen Proving Ground City: Edgewood Zip Code: 21005

County: Harford USGS Topographic Map: Edgewood

Owner: U.S. Army Garrison, APG, Department of the Army, DoD

Tax Parcel Number: NA Tax Map Number: NA Tax Account ID Number: NA

Project: NA Agency: U.S. Army Garrison, APG

Site visit by MHT Staff: X no ___yes Name: _____ Date: _____

Eligibility recommended ____ Eligibility **not** recommended XX

Criteria: X A X B X C X D Considerations: ___A ___B ___C ___D ___E ___F ___G ___None

Is the property located within a historic district? ____no ____yes Name of district: _____

Is district listed? ___no ___yes Determined eligible? ___no ___yes District Inventory Number: _____

Documentation on the property/district is presented in:
MIHP Form HA-2049

Description of Property and Eligibility Determination: *(Use continuation sheet if necessary and attach map and photo)*

The purpose of this Maryland Inventory of Historic Properties (MIHP) form is to document the evaluation of the U.S. Ordnance Assembly Plant at Edgewood Arsenal applying the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]) as part of the ongoing Section 110 responsibilities of the Cultural Resources Management Program at Aberdeen Proving Ground. The APG Integrated Cultural Resource Management Plan (ICRMP) identified this area of Edgewood Arsenal as requiring further study and assessment as two possible districts. All buildings in the area lack individual distinction (RCGA, Inc., 1993, 1996, 2001).

The U.S. Ordnance Assembly Plant at Edgewood Arsenal was constructed by the Ordnance Department in 1941-1942 as part of the nationwide military construction program during the protective mobilization period preceding World War II (Whelan et al. 1997). The majority of the building stock is permanent masonry construction. Of the 55 resources in the area, 41 were constructed during World War II, while 8 buildings and structures were added to the complex between 1951 and 1953. The Ordnance Assembly Plant was most active during World War II (1941-1945); a secondary period of activity during the Korean Conflict (1951-1953). During the remainder of the time, the plant was either on standby or on caretaker status. Occasionally, one of the ordnance assembly buildings was activated to fill small or specialty orders. The Ordnance Assembly Plant ceased to be a independent production facility on 1 January 1963 and the complex was no longer operated as an integrated complex. Individual buildings were reused in accordance with the overall operation requirements of Edgewood Arsenal and, after 1971, Aberdeen

MARYLAND HISTORICAL TRUST REVIEW

Eligibility recommended ____ **Eligibility not recommended** X

Criteria: ___A ___B ___C ___D **Considerations:** ___A ___B ___C ___D ___E ___F ___G ___None

Comments:

Andrew Lewis 9/1/04
Reviewer, Office of Preservation Services **Date**

Peter E. Land 9/1/04
Reviewer, NR program **Date**

20040252 2

Proving Ground. Thus, the period for evaluation of the plant is 1941-1962, during which time the plant operated as a separate entity under the Ordnance Department at Edgewood Arsenal.

On the national level, the appropriate historic context for evaluating the U.S. Army Ordnance Assembly Plant is the *Historic Context for Department of Defense Facilities World War II Permanent Construction* (Whelan et al. 1997). The Ordnance Assembly Plant at Edgewood Arsenal was constructed by the Ordnance Department as part of the first wave of 31 ordnance installations associated with the nationwide military buildup during the protective mobilization period prior to World War II. The Ordnance Assembly Plant exhibits similar construction, design, and materials to other ordnance plants constructed during the period, irrespective of whether the installation was government-owned, contractor-operated (GOCO) or government-owned, government-operated (GOGO). The Ordnance Assembly Plant at Edgewood Arsenal was a small installation in comparison to other ordnance installations. At most other ordnance assembly plants, a single production line was contained in multiple-building complexes. At the Ordnance Assembly Plant at Edgewood Arsenal, multiple short ordnance assembly lines were housed in one building. The exterior design of the ordnance assembly buildings did not reflect a single industrial process, but the processes were adapted to various kinds of ammunition finishing, as needed. No evidence of the industrial processes survives in the ordnance assembly buildings. The designs used for the above-ground ammunition warehouses and igloos were standardized plans used for storage facilities at all ordnance installations and depots. During World War II, the Ordnance Department operated 35 ordnance works that produced propellants and high explosives, 31 ordnance assembly plants that produced completed ammunition rounds, and 24 ammunition storage depots across the United States.

The *Historic Context for Department of Defense Facilities World War II Permanent Construction* (Whelan et al. 1997) outlined an approach for the evaluation of permanent World War II construction. World War II was a crucial event in U.S. history, but not all buildings and structures constructed by the military or by civilian contractors during World War II are significant within the historic context of World War II. Military construction typically was planned and executed as part of a national defense program that expended billions of dollars in the construction of thousands of facilities. To evaluate a property as significant within the context of World War II permanent construction, that property must have an important and specific association with World War II (Whelan et al. 1997).

The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal does not possess important or specific associations with World War II history under National Register Criterion A. The role of the Ordnance Assembly Plant was to finish previously-filled chemical shells produced in the chemical production plants at Edgewood Arsenal into live ammunition rounds. The plant was not associated with the production of chemicals, but with finishing the chemical shells through the addition of propellants, bursters, and fuzes. The assembling of chemical munitions by the Ordnance Department represented a small percentage of overall U.S. ammunition production and the Ordnance Assembly Plant at Edgewood Arsenal produced the smallest amount of the CWS stockpile. The stockpiles of gas-filled ammunition were not deployed on the battlefield, but they served as a deterrent to enemy use of chemical weapons. The conclusion is that the U.S. Army Ordnance Assembly Plant at Edgewood Arsenal was a small installation that did not play an important or specific role in the overall history of World War II ammunition production.

The U.S. Army Ordnance Assembly Plant played a minor support role in the history of the Chemical Warfare Service (CWS) at Edgewood Arsenal. Between 1923 and 1962, the Ordnance Department operated as a separate command in buildings located on arsenal property; however, the department was not under the direct command of the Chemical Warfare Service (CWS). Historically, the importance of Edgewood Arsenal is its history as the first and only chemical warfare industrial plant in the United States during the period 1917 to 1941. During World War I, Edgewood Arsenal functioned as an integrated chemical production line, with receiving and production areas for raw materials, industrial plants to produce chemicals, and shell-loading plants to prepare chemical ammunition. By

World War II, chemical production at Edgewood Arsenal was contained in individual buildings or small complexes of buildings dedicated to the production of specific chemicals. Between 1941 and 1943, the production of chemicals in bulk was shifted to the three large chemical arsenals constructed in other parts of the U.S. Edgewood Arsenal became the center for specialized and experimental tasks, such as the establishment of pilot plants to test new chemicals, smokes, and new production processes. The significant history of Edgewood Arsenal is embodied in the industrial plants and the research laboratories that occupy the central core of the installation. The Ordnance Department played no role in the production of chemicals or in filling chemical shells. Thus, the U.S. Army Ordnance Assembly Plant was associated in only subordinate way to the principal missions at Edgewood Arsenal.

Within the context of state and local history, the U.S. Army Ordnance Assembly Plant was located within the boundaries of Edgewood Arsenal. The impact of the Ordnance Assembly Plant on the state and local economy or society were subsumed by the larger-scale activities and higher employment rates associated with Edgewood Arsenal and nearby Aberdeen Proving Ground.

The buildings and structures that comprise the U.S. Army Ordnance Assembly Plant do not possess the qualities of significance in American architecture for listing in the National Register of Historic Places. The World War II buildings constructed for the Ordnance Assembly Plant included an administration building, three ordnance assembly buildings, inert storage buildings, and a complement of magazines to store high explosives, smokeless powder, standard ammunition, and white phosphorus. The buildings are constructed of structural clay tile and/or brick and do not exhibit significant physical design or construction techniques. The storage facilities utilized standardized plans that were developed during the 1930s by the U.S Army Quartermaster Corps and constructed nationwide between 1938 and 1943. Their construction at the U.S. Army Ordnance Plant at Edgewood Arsenal did not illustrate the adaptation of new engineering technologies or new construction materials. The buildings types were not unique for GOCO or GOGO installations or for the assembling of chemical munitions. The building types were found throughout the Army building inventory at ordnance depots, ordnance plants, ordnance works, CWS arsenals, and CWS depots.

The U.S. Army Ordnance Plant ceased operations as an independent plant on 1 January 1963. The individual buildings were adapted to other uses and integrated into the overall operations of Edgewood Arsenal and, later, Aberdeen Proving Ground. The cumulative changes that have occurred over the last forty years have diminished the integrity of setting, feeling, and association of the former Ordnance Assembly Plant area as a separate entity linked historically or aesthetically by plan or physical development. Individual buildings were modified for new uses. The integrity of the design of the administrative building (Building E5800) has been compromised by a 1990s addition that altered the ground plan of the building. The three ordnance assembly buildings (Building E5826, E5830, and E5840) have no original World War II ordnance assembly equipment and no evidence of the industrial processes that once occurred in the buildings. A few buildings and structures were removed from the area, including the World War II igloos, a few ordnance storage buildings, and the temporary personnel support buildings. In 1968, a new multi-story laboratory, Building E5951, was constructed on the western edge of the warehouse area. This large, self-contained, utilitarian, monolithic building is surrounded by fencing and controlled access gates. The massive laboratory building interrupts the regular spacing of the nearby warehouse area and is out of scale with the surrounding warehouses in its design, size, and construction materials.

Other changes that have impacted the cohesiveness of the area include the removal of railroad lines throughout the complex, the removal of fencing that defined the former plant as separate from the rest of Edgewood Arsenal, and changes in landscape. Historic photographs dated 1941-1942 depicted the former Ordnance Assembly Plant as clear of vegetation so that all components of the complex were visually linked and the layout of the Ordnance Assembly Plant was clear. The layout of the former plant and the connections between the buildings are no longer visually

evident. Thus, the former Ordnance Assembly Plant now reads as part of the larger Edgewood Area, rather than as a separate installation that it was historically between 1941 and 1962.

The U.S. Army Ordnance Assembly Plant has no known associations with the lives of significant people under Criterion B. It is not anticipated that the complex will yield information important to World War II or Cold War historic contexts under Criterion D.

Prepared by: Katherine Grandine, R. Christopher Goodwin & Associates, Inc.

Date Prepared: April 2004

CAPSULE SUMMARY
U.S. Army Ordnance Assembly Plant
MIHP # HA-2049
Edgewood Area, Aberdeen Proving Ground
Harford County, Maryland
1941-1942
Federal property, no access

The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal (HA-2049) was constructed in 1941 as an independent plant to accommodate the expanded activities of the Ordnance Department during protective mobilization period preceding World War II. The role of the Ordnance Department was to finish filled chemical shells produced at Edgewood Arsenal into complete rounds of chemical ammunition. The Ordnance Department operated the plant between 1941 and 1962, when the plant ceased operations as a separate entity and the buildings and structures were integrated into the larger operations of Edgewood Arsenal and, after 1971, Aberdeen Proving Ground.

The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal does not possess important or specific associations with World War II history under National Register Criterion A. The assembling of chemical munitions by the Ordnance Department represented a small percentage of overall U.S. ammunition production and the Ordnance Assembly Plant at Edgewood Arsenal produced the smallest amount of the CWS stockpile. The stockpiles of gas-filled ammunition were not deployed on the battlefield. The Army Ordnance Assembly Plant at Edgewood Arsenal was a small installation that did not play an important or specific role in the overall history of World War II ammunition production.

The U.S. Army Ordnance Assembly Plant played a minor support role in the history of the Chemical Warfare Service (CWS) at Edgewood Arsenal and was not associated with the significance of the arsenal as the first and only chemical warfare industrial plant in the United States during the period 1917 to 1941. Within the context of state and local history, the impacts of the Ordnance Assembly Plant on the state and local economy or society were subsumed by the larger-scale activities and higher employment rates associated with Edgewood Arsenal and nearby Aberdeen Proving Ground.

The buildings and structures that comprise the U.S. Army Ordnance Assembly Plant do not possess the qualities of significance in American architecture for listing in the National Register of Historic Places under Criterion C. The World War II buildings are constructed of structural clay tile and/or brick and do not exhibit significant physical design or construction techniques. The storage facilities utilized standardized plans that

were developed during the 1930s by the U.S Army Quartermaster Corps and constructed nationwide between 1938 and 1943.

After the plant ceased operations as an independent plant on 1 January 1963, the individual buildings were adapted to other uses and integrated into the overall operations of Edgewood Arsenal and, later, Aberdeen Proving Ground. The cumulative changes that have occurred over the last forty years have diminished the integrity of setting, feeling, and association of the former Ordnance Assembly Plant area as a separate entity linked historically or aesthetically by plan or physical development. Individual buildings were modified for new uses. The processing equipment was removed from the three ordnance assembly buildings. A few buildings and structures were removed from the area. In 1968, a new multi-story laboratory, Building E5951, was constructed on the western edge of the warehouse area. This large, self-contained, utilitarian, monolithic building is surrounded by fencing and controlled access gates. The massive laboratory building interrupts the regular spacing of the nearby warehouse area and is out of scale with the surrounding warehouses in its design, size, and construction materials. Other changes that have impacted the cohesiveness of the area include the removal of railroad lines throughout the complex, the removal of fencing that defined the former plant as separate from the rest of Edgewood Arsenal, and changes in landscape. The layout of the former plant and the connections between the buildings are no longer visually evident. Thus, the former Ordnance Assembly Plant now reads as part of the larger Edgewood Area, rather than as a separate installation that it was historically between 1941 and 1962.

The U.S. Army Ordnance Assembly Plant has no known associations with the lives of significant people under Criterion B. It is not anticipated that the complex will yield information important to World War II or Cold War historic contexts under Criterion D.

Maryland Historical Trust
Maryland Inventory of
Historic Properties Form

Inventory No. HA-2049

1. Name of Property (indicate preferred name)

historic	U.S. Army Ordnance Assembly Plant
other	

2. Location

street and number	Edgewood Area, Aberdeen Proving Ground	X not for publication
city, town	Edgewood, MD	X vicinity
county	Harford	

3. Owner of Property (give names and mailing addresses of all owners)

name	U.S. Army Garrison, APG, Department of the Army, DoD				
street and number	2201 Aberdeen Blvd			telephone	410-278-6756
city, town	APG	state	MD	zip code	21005

4. Location of Legal Description

courthouse, registry of deeds, etc.	Harford County Courthouse			liber	folio
city, town	Bel Air	tax map	tax parcel		tax ID number

5. Primary Location of Additional Data

_____ Contributing Resource in National Register District
_____ Contributing Resource in Local Historic District
_____ Determined Eligible for the National Register/Maryland Register
_____ Determined Ineligible for the National Register/Maryland Register
__X__ Recorded by HABS/HAER
_____ Historic Structure Report or Research Report at MHT
_____ Other:_____

6. Classification

Category
__x__ district
_____ building(s)
_____ structure
_____ site
_____ object

Ownership
__x__ public
_____ private
_____ both

Current Function
_____ agriculture
_____ commerce/trade
__x__ defense
_____ domestic
_____ education
_____ funerary
_____ government
_____ health care
_____ industry
_____ landscape
_____ recreation/culture
_____ religion
_____ social
_____ transportation
_____ work in progress
_____ unknown
_____ vacant/not in use
_____ other:

Resource Count

Contributing	Noncontributing	
_____	44	buildings
_____	11	sites
_____	_____	structures
_____	_____	objects
_____	55	Total

Number of Contributing Resources previously listed in the Inventory
1

7. Description

Inventory No. HA-2049

Condition

___ excellent ___ deteriorated
_x_ good ___ ruins
___ fair ___ altered

Prepare both a one paragraph summary and a comprehensive description of the resource and its various elements as it exists today.

RESOURCE COUNT: 55

SUMMARY

The U.S. Army Ordnance Assembly Plant is a complex of small-scale, one-story, functional buildings that occupies approximately 350 level acres located on the west side of Edgewood Area, the former Edgewood Arsenal. The majority of the buildings were constructed between 1941 and 1942. A few buildings were added to the complex during the early 1950s. The construction dates cited in this description are based on archival data, real property records, drawings, and historic photographs.

The U.S. Army Ordnance Assembly Plant was originally designed as an independent functioning, fenced installation within the boundaries of Edgewood Arsenal. The plant had two primary foci: (1) administration and ordnance assembly buildings and (2) warehouses. The administration and personnel support buildings and the three ordnance assembly buildings were located on the eastern portion of the complex to allow access to the main area of Edgewood Arsenal. The ordnance assembly buildings were located along Atkinson Road just west of the administration area. The warehouses for both inert materials and ammunition were dispersed throughout the western section of the complex. Most buildings were constructed of structural clay tile.

Historically, the Ordnance Assembly Plant was defined on the northern and eastern boundaries by fencing. Primary access to the plant was along its eastern edge. Fencing along the western boundary coincided with the boundary of Edgewood Arsenal. The ordnance assembly buildings and the warehouses were serviced by road and railroad networks. The roads were sited along the east elevations of the buildings and railroad lines provided access to the west elevations. The road network comprised six major roads that were oriented northeast to southwest. A few cross streets linked the primary roads. The railroad lines, which have subsequently been removed, were sited parallel to the road network. The railroad lines converged at a trunk line at the north end of the complex that was linked to the main railroad line that servicing the Edgewood Area. The ammunition warehouses were spaced along these transportation networks at intervals in accordance with contemporary ordnance storage safety manuals (U.S. Ordnance Department 1941).

Historically, the U.S. Army Ordnance Assembly Plant was designed as an independent entity under the operation of the Ordnance Department. The Ordnance Assembly Plant shared security, fire protection, medical care, and utilities with the greater Edgewood Arsenal. In the three ordnance assembly buildings, previously-filled chemical shells produced in the chemical production plants at the arsenal were finished into live rounds through the addition of casings, bursters, and fuzes. Materials to supply the processes undertaken in the assembly buildings were stored in the warehouses, as were finished ammunition rounds prior to transfer to long-term storage depots or shipment to combat areas.

The complex operated as an integrated installation under the Ordnance Department between 1941 and 1962. On 1 January 1963, the U.S. Army Ordnance Plant ceased to function as a separate, integrated entity. The individual buildings were adapted to other uses and integrated into the overall operations of Edgewood Arsenal and, later, Aberdeen Proving Ground. The former administration building (Building E5800) was modified to serve as a laboratory and office building. The former personnel change house (Building E5803) now serves as a general-purpose laboratory. The former ordnance assembly buildings were converted to administrative use and/or storage. No original World War II ordnance assembly equipment survives in the former industrial complex and, thus, no evidence of the industrial processes that occurred in the buildings. The storage buildings remain in use for general-purpose storage; one former magazine was adapted to house a

wind tunnel. Typical changes to the former ordnance magazines include modifications to doorways and doors and alterations to roof materials and vents. The general-purpose warehouses located along the north edge of the former plant were integrated into the overall operations of other warehouse areas at Edgewood Arsenal, particularly the warehousing located east along Magnolia Road. A few buildings and structures were removed from the area, including the World War II igloos, a few ordnance storage buildings, and the temporary personnel support buildings. In 1968, a new multi-story laboratory, Building E5951, was constructed on the western edge of the warehouse area. This large, self-contained, utilitarian, monolithic building is surrounded by fencing and controlled access gates. The massive laboratory building interrupts the regular spacing of the nearby warehouse area and is out of scale with the surrounding warehouses in its design, size, and construction materials.

The cumulative changes that have occurred to individual buildings as they were adapted to new uses and the construction of a large laboratory at the western edge of the complex have resulted in diminishing the integrity of setting, feeling, and association of the former Ordnance Assembly Plant area as a separate entity linked historically or aesthetically by plan or physical development. Other changes that have impacted the cohesiveness of the area include the removal of railroad lines throughout the complex, the removal of fencing that defined the former plant as separate from the rest of Edgewood Arsenal, and changes in landscape. Historic photographs dated 1941-1942 depicted the former Ordnance Assembly Plant as clear of vegetation so that all components of the complex were visually linked and the layout of the Ordnance Assembly Plant was clear. The layout of the former plant and the connections between the buildings are no longer visually evident. Second-growth trees have grown up between the major roads along which the magazines are sited and around the individual magazines. The vegetation obscures the visual relationships between individual warehouses in a row and between the rows of warehouses. This vegetation effectively screens each line of magazines from each other and from the industrial portion of the former plant. Thus, the former Ordnance Assembly Plant now reads as part of the larger Edgewood Area, rather than as a separate installation that it was historically between 1941 and 1962.

BUILDING DESCRIPTIONS

Administration

Building E5800, the former administration building, is located on 40th Street at the eastern edge of the complex. It currently serves as a laboratory and office space. Building E5800 was constructed in two phases. The north wing was completed in 1941 (NARA RG77 Entry 393). The south wing was added in 1942 (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, historic photograph dated 1942). The building was designed by the Construction Division, U.S. Army Quartermaster Corps. The engineering firm of Whitman Requardt & Smith-Engineers of Baltimore constructed the building (HABS 1982).

E5800 is a one-story, brick building that occupies an off-set H-shaped ground plan. The building rests on a concrete slab and is constructed of stretcher bond brick. The gable roofs are sheathed with corrugated transite. The north elevation has eight bays, including an off-set, two-bay brick garage attached to the east end of the building. The attached garage has a shed roof and contains two wood-panel overhead garage doors. A one-bay projecting entry vestibule is located on the north elevation. The vestibule contains paired, four-light wood doors. The west end of the north section contains four, metal-frame, industrial-sash windows. The south section of the building has six bays of industrial-sash windows along the

south elevation and doorways located in the east and west gable ends. These doorways contain wood-panel, four-light doors. Each door is located in an enclosed one-bay, projecting wood-frame vestibule with a gable roof. A one-story brick addition completed during the 1990s infilled the H on the east elevation and currently serves as laboratory space. This alteration has compromised the integrity of design of Building E5800.

Personnel Support

Building E5803 is located south of Building E5800. The building was constructed in 1953 as an employee change house, and originally contained showers, dressing rooms, and storage lockers to accommodate 220 production-line workers. It was completed at a cost of $99,000 by the Baltimore construction firm of Kirby and McGuire. Interior renovations to the building that removed the showers and toilets were completed in 1986 (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, building vertical file; EAI Corporation 1991). The one-story building occupies a rectangular plan and has eight symmetrical bays along the east elevation and nine asymmetrical bays along the north elevation. The exterior walls are finished with cement stucco. The east elevation contains paired metal doors with barred lights. A metal awning is located over the doors. One-over-one-light replacement windows are located on the east elevation. A single metal door is centered in the north elevation. The narrow window openings along the north elevation contain glass block. The gable roof is sheathed with corrugated transite. The roof has two metal vents. A boiler plant is located on the southwest corner of the building. A square tapered brick smokestack is located on the south elevation of the boiler plant. A fenced parking lot is located on the south side of the building. This building currently serves as a general-purpose laboratory.

During the 1950s, the change house was linked to the ordnance assembly buildings by 1,327 feet of walkways that were enclosed in corrugated transite siding. The purpose of the enclosed walkways was to protect production workers who were wearing safety uniforms from inclement weather on their walk to the ordnance assembly buildings (*Army Chemical Center News* 1952). Only a few short sections of the covered walkways remain extant in the complex.

Industrial Buildings

Buildings E5826, E5830, and E5840 were the primary industrial buildings in the Ordnance Assembly Plant. Original plans for the complex called for the construction of two ordnance assembly buildings, each containing four assembly lines. Buildings E5826 and E5830 were completed in 1941. In 1942, Building E5840 became the third ordnance assembly building constructed at the complex. No equipment related to the assembly process survives in the three ordnance assembly buildings (Grandine and Armstrong 1997).

Building E5826 was completed on 29 August 1941 and was placed in service in September. The one-story, building occupies a rectangular ground plan and measures 305 ft x 58 ft. The building has a steel frame encased in brick. The side elevations are divided into fifteen asymmetrical bays that are defined by brick piers. The walls between the brick piers are constructed of ridged structural clay tile, laid in horizontal courses. A three-course brick beltcourse is found above the windows and two courses of brick accent the eaves. The typical bay contains paired metal doors set under a transom. The doors are four-light over single metal panel units. Some metal-frame transoms contain four lights, while others contain fifteen lights. The center bays contain paired and single doors. Some door openings have been infilled. The windows are

metal-frame, nine-light industrial sash units with hoppers. The building is capped with a metal-truss monitor roof sheathed in corrugated transite. The walls of the monitor roof are formed by a continuous band of twelve-light, metal-frame, industrial sash units. Two concrete firewalls project above the roofline on either side of the center bay of the building. The metal roof trusses are extended over the east and west elevations to shelter poured concrete loading platforms. Three large conical metal vents, twelve circular metal vents, and one metal drum vent project from the roof. All vents are fitted with lightning rods.

Building E5830 was completed by 29 September 1941 and was placed in operation during December 1941 (NARA, RG 156, Entry 646, Box A59; RG 77, Entry 393). The design of the building was credited to the Construction Division, Office of the U.S. Army Quartermaster; the firm of Whitman Requardt & Smith-Engineers was the construction contractor (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, building vertical files). The one-story, twenty-four bay building is constructed of structural clay tile and occupies a rectangular plan. The steel frame is encased in brick piers, which define the bays. The original building measured 321 ft x 74 ft. The building rests on a concrete slab foundation. The exterior cladding is ridged structural clay tile laid in horizontal courses. A brick beltcourse is located over the window openings and brick is also located at the eave line. The building has double hinged steel doors. Each door has four lights over one metal panel. Each door bay includes a fifteen-light, metal-frame transom. The windows on the east and elevation are nine-light, metal-frame units with concrete slip sills. The monitor roof is sheathed in corrugated metal sheeting. The monitor roof features an industrial sash clerestory and one external metal stack. The stack is secured to the roof with cables. Two raised poured-concrete loading docks are attached to the building. The loading docks span the entire length of the east and west elevations. Both loading docks are covered by the building roof, which extends over the platforms. The extended roofs are supported by projecting steel roof trusses.

The south end of Building E5830 was extended in 1944 to include ten bays and a large concrete loading platform (EAI Corporation 1991; HABS 1982). The addition was designed by Van Rensselaer P. Saxe, engineers, and the U.S. Army Corps of Engineers (HABS 1982; U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, building vertical files). The contractor was Leimbach and Williams of Baltimore. Construction started in January 1944; the building was occupied in March 1944. The addition was constructed to provide space for temporary storage of completed rounds and to crate ammunition for shipment (NARA, RG 156). This addition has a concrete frame infilled with a ridged structural clay tiles and glass block. The addition is accessed by single, off-center, metal doors marked by concrete stoops and steps and one overhead door.

The poured-concrete shipping platform constructed in 1944 is located west of Building E5830. The platform is sheltered by a low-pitched, butterfly roof framed with riveted steel and sheathed in corrugated transite. The covered platform is connected to the main building by a short platform extension.

Building E5840, completed in December 1942 and extended in 1951, was originally designed for burstering 155 mm chemical shells (NARA, RG 156, Box A59). It is located on 42nd Street. The one-story building is divided visually into three sections. The west end and one-story boiler plant were constructed in 1942. The east end was built in 1951. The entire building rests on a poured concrete wall foundation and is constructed of structural clay tile. The gable roof extends to wide overhangs that shelter poured concrete loading platforms on the north and south elevations of the building. A

gravel and asphalt parking area is located north of the building, while a rail spur provided access to the south elevation of the building.

The eleven-bay west section is constructed of smooth structural clay tiles. The gable roof over this section is constructed of bolted wood trusses. The roof is sheathed in composition roll roofing. Five wood-frame square louvered ventilation cupolas project from the roof ridge. This original section of the building has asymmetrical bays. Some bays contain original single or paired metal doors; selected door bays have been infilled with concrete block. The windows are one-over-one-light or six-over-one-light, double-hung sash units. The window and door openings are finished with brick quoins and concrete lintels. The three center bays on the north elevation contain paired four-light over two wood panel doors. The doors are enframed by five-light sidelights and large four-light transoms.

A boiler plant is attached to the southwest corner of the 1942 building. The boiler plant features a massive square brick stack. The boiler plant terminates in a truncated monitor roof, which extends to a shed roof along the south elevation. The doorway is located on the north elevation off a loading platform. The door is a four-light over three wood panel unit with a concrete lintel. The window openings on the north elevation are boarded. The doors on the south elevation have been infilled with concrete block.

The seven-bay addition, constructed in 1951 on the east end of the building, is built of horizontally ridged tiles. The gable roof over this section is constructed of metal trusses and is sheathed with standing seam metal. Three circular metal vents project from the roofline. The north elevation has three sets of paired exterior sliding doors. Each door is an eight-light metal unit. A one-light metal door is centered on the east gable end. The metal-frame industrial windows contain nine lights on the east end and six lights on the north elevation. The window openings have concrete slip sills. The windows are grouped singly and in pairs. The window and door openings are finished with brick quoins.

All three ordnance assembly buildings originally exhibited similar interior plans. Buildings E5826 and E5830 originally housed four self-contained ordnance assembly lines, two in each end of the building. The center bay as defined by concrete firewalls was the cartridge case storage and primer inserting area; this area also contained an office. The areas containing the conveyor belts were largely open space. Each line had two enclosed areas; one was the powder weighing room and one was identified as explosives assembly room. The assembly lines were not configured to produce only one type of ammunition, but were adaptable for assembling different calibers of chemical ammunition, regardless of the chemicals contained in the shells. Women and men's lavatories were located at one end of the building (EAI Corporation 1991: Building E5830). Building E5840 originally contained two assembly lines in the west section of the building constructed in 1942. The layout of this section was similar to one end of the other two assembly buildings (EAI Corporation 1991: Building E5840). The original spaces have been reconfigured to accommodate new uses in all three buildings and no original ordnance assembly equipment survives.

Building E5828, the former Heating Plant/Pipe Shop, is located on Atkinson Road between Buildings E5830 and E5826. The building was constructed in two phases: the southern half was completed in 1941 and northern half, a motor repair shop, was built in 1942 (NARA RG 77, Entry 393, Edgewood Arsenal). The one-story building rests on a concrete slab. The southern half of the building incorporates a steel frame and is clad with corrugated transite. The northern half of the building is wood-frame construction and clad in wooden drop siding. The low-pitched shed roof is sheathed in transite.

The building has multiple entries. Four metal overhead track doors and one set of paired multi-light metal doors with a transom are located in the east elevation. Two single metal doors, each with four lights and two horizontal panels, are located in the north elevation. The three door bays on the west elevation house a single door with three horizontal wood panels, a single door with five horizontal wood panels, and a pair of hinged, twelve-light metal doors, respectively. A single metal door with four lights and one panel is located on the south elevation. The windows in the east elevation are metal-frame industrial sash. The windows in the north and west elevations are six-light, wood-sash units. An exterior freestanding smokestack near the south elevation rests on a hexagonal foundation of poured concrete. The smokestack is constructed of smooth structural clay tile and is reinforced with six exterior iron bands.

Building E5824 historically housed the stores division office and receiving/issuing warehouse. A historic photograph and a map depict this building under construction in 1942 (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, historic photograph). The one-story building occupies an L-shaped plan and rests on a concrete slab foundation. The low-pitched gable roof is sheathed in transite. The building was constructed in two sections. The southern section of the building is constructed of smooth structural clay tile with brick quoins around the window openings. This section of the building has steel roof trusses. The north end of the building is wood frame, including the roof trusses. The exterior cladding is board-and-batten wood siding; corrugated transite is found in the upper gable end. The building includes multiple door entries. Four wood double doors with metal strap hinges are found in the north portion of the building. Four board-and-batten double doors are located in the south portion of the building. A single six-light and two-panel wood door is also located in the south portion of the building. The windows in the south portion of the building are metal-frame, paired, six-light units. The windows in the north portion of the building are paired, wood-sash, one-over-one-light units. An elevated loading dock, constructed of poured concrete, spans the west elevation and a portion of the east elevation. The loading docks are accessed by poured concrete stairs at the south end. A metal dust collector is located on the east elevation.

Building E5854, constructed in 1945 as a Machine Shop, is located on the southwest corner of the intersection of Atkinson and Lagoon roads. This one-story, 7-bay building is built of concrete block and rests on a concrete slab foundation. The gable roof is sheathed with composition roll roofing. A shed roof spans the south elevation. Three circular metal vents and one curved metal vent project from the roof. The tripled windows are twelve-over-twelve-light, wood-frame, double-hung units with concrete slip sills. Windows on the south elevation are wood-frame, six-over-six-light, double-hung sash. Doors into the building include a single plywood door on the east gable end, two sets of paired plywood doors with exterior strap hinges on the south elevation, and two large overhead roll doors with plexiglass ovals on the north elevation. The interior plan is open. The U.S. Army Corps of Engineers designed the building (HABS 1982).

Storage Buildings

The Ordnance Assembly Plant was equipped with a variety of storage buildings, including both inert storage and standardized ammunition storage buildings. General-purpose warehouses were used to store inert materials, such as small-arms ammunition, sodium nitrate, bleach, gas masks, protective clothing, and other materials that were not explosive hazards (U.S. Ordnance Department 1941). Ordnance storage buildings were built to contain materials that were explosive hazards. These building types comprised a variety of above-ground storage buildings and concrete igloos. The size of the above-

ground buildings determined what was stored in the building. In general, the more volatile materials were stored in smaller buildings.

General Purpose Warehouses

Building E5664, constructed in 1941, is an example of poured-concrete general warehouse. This rectangular one-story building measures 402 x 68 feet and terminates in a gable roof. The warehouse has a concrete foundation, slab floor and 7-foot high concrete walls. A steel frame bolted into the concrete wall supports a continuous horizontal band of industrial metal-sash windows on all four elevations. Corrugated transite siding covers the gable ends and gable roof. A concrete firewall projects above the gable roof at the building's midpoint. A metal ventilator projects from the roof. The east and west elevation each contain twenty-four sliding metal doors. In general, alterations to the buildings include infilled or modified door openings and replacement door units. Raised concrete loading docks span the side elevations. Building E5664 is the only one of its type located in the vicinity of the Ordnance Assembly Plant, but examples of this warehouse type are found in several locations in the Edgewood Area. The standardized design was developed by the Construction Division of the U.S. Army Quartermaster Corps. The constructing contractor was Whitman Requardt & Smith-Engineers of Baltimore, Maryland.

Six general purpose warehouses are located in the northern section of the Ordnance Assembly Plant south of Westwood Road and north of Lagoon Road. Buildings E5910, E5911, E5912, and E5913, constructed in 1942, were originally classified as inert material warehouses. These buildings are dated 1945 in the APG real property records; however, the buildings appeared on a 1942 map of the Edgewood Area and in a 1942 photograph (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, 1942 map; NARA, RG 77, Entry 391). Each one-story warehouse measures approximately 66 x 400 feet (twenty-two bays long). Each building rests on a low poured concrete wall foundation. The upper walls are metal frame clad in corrugated transite. Each low-pitched gable roof is sheathed in transite and features a horizontal metal ridge vent. The doors are located in the long elevations. Each bay contains a riveted steel sliding door mounted on an interior track. Overhead track steel doors have been installed in some bays. Each doorway is lit by a single light fixture. Raised concrete loading docks span the length of each building. A poured concrete stairway with pipe railings at the south gable end of each warehouse provides access to the loading dock. A poured concrete ramp at the north gable end also provides access to the loading dock. A projecting one-story brick utility bay is centered on one wall of each building. The bays are constructed of brick laid in 6:1 common bond on concrete slab foundations and have flat roofs clad in metal. The main entries to the brick bays contain steel exterior doors with three exterior hinges. The buildings were constructed using drawings supplied by the Office of the Constructing Quartermaster, Savanna Ordnance Depot, Savanna, Illinois (HABS 1982).

Buildings E5914 and E5915 were added to the warehouse area in 1945. Both buildings were constructed on concrete slabs. Building E5914 is a one-story, nineteen-bay, rectangular building. The exterior cladding is corrugated galvanized steel sheeting. The low-pitched gable roof is sheathed in corrugated galvanized steel sheeting. A metal drip cap spans the length of both side elevations. Twenty metal ventilation stacks, symmetrically spaced, are centered on the ridge. The west wall has seventeen exterior sliding track doors and two overhead track steel doors. The east wall has nineteen sliding track doors. Each doorway is lit by a single caged light fixture. A one-story, one-bay, common-bond brick utility bay is

centered on the east elevation. The bay rests on a concrete slab foundation and has a flat roof clad in metal. The entry is centered on the front elevation and contains a steel exterior door with three exterior hinges.

Building E5915, also constructed in 1945, is a one-story, steel-frame, twenty-bay building. The rectangular building rests on a concrete slab foundation. The exterior cladding is standing-seam metal sheeting. The low-pitched arched roof is sheathed in standing-seam metal sheets. Paired exterior metal sliding track doors are located along the side elevations. A one-story utility bay, centered on the west elevation, is constructed of brick laid in 6:1 common bond. It rests on a concrete slab foundation and has a flat roof clad in metal. The bay is accessed by a central steel exterior door with three exterior hinges.

The raised concrete loading dock (E5916), located on Lagoon Road between buildings E5914 and E5915, was constructed in 1963 (APG, DPW, Real Property records). The platform is edged with iron coping. Poured concrete ramps provide access to the loading platform from each end. A raised concrete coping lines the edges of the ramps. This loading dock is aligned with the inactive railroad spur that provided access to this area of the plant.

Building E5858 is an elevated, covered loading dock and freight station that is located near the northeast end of Austin Road. Built in 1957, the platform is constructed of concrete and buttressed with concrete block piers (APG, DPW, Real property records). The platform is accessed by wooden steps supported on concrete walls. The center of the platform is enclosed with a metal-frame section clad with corrugated transite. The gable roof is sheathed with corrugated transite. The enclosed section is accessed by a single, six-light metal door at each end. Metal-frame windows are located on the side elevations. The whole length of the platform is sheltered under a gable roof supported on metal posts that extends from either side of the enclosed central section.

Ordnance Storage

Ordnance storage associated with the plant comprises above-ground magazines constructed in 1941 and igloos constructed in 1953. The above-ground buildings represent three types of standardized magazines: standard ammunition magazines, smokeless powder magazines, and explosives magazines. These standardized plans were developed by the U.S. Army Quartermaster during the 1930s. Examples of these standardized plans were built nationwide at ordnance depots and ordnance assembly plants. At Edgewood Area, the same types of above-ground ordnance storage magazines were constructed Eastern Chemical Warfare Depot (HA-1988) (Grandine 1998). The constructing contractor was Whitman Requardt & Smith-Engineers of Baltimore, Maryland.

Constructed in 1941, Buildings E5884, E5886, E5888, E5890, E5892, E5894, E5896, E5926, E5928, and E5936 are examples of standard ammunition magazines designed to store fixed or separate loading shell and shrapnel (U.S. Ordnance Department 1941). These one-story, rectangular buildings measure 218 x 51 feet. The buildings have a metal frame encased in structural clay tile. The exterior walls are constructed of ridged 8-inch structural clay tiles. Brick is used to infill the rake at the eave line and the corners. The buildings rest on concrete slabs. Each building contains eleven openings in each long elevation that house metal sliding doors. Each steel-frame gable roof is sheathed in corrugated transite. The roof has eleven circular ventilators that project from the ridge. Alterations common to the buildings listed above include installation of replacement door units, infilled doorways, alterations to roofing materials, and removal and/or alteration of vents. The

doorways on the east elevations are accessed by roads, while the doorways on the west elevation were historically accessed by rail. Each doorway on the west elevation has an individual concrete pad. The rail lines have been removed. The typical interior plan was unobstructed open space.

Buildings E5842, E5844, E5846, E5848, E5860, E5862, E5930, E5932 measure 110 x 37 feet and historically are classified as standard smokeless powder magazines designed to store 500,000 pounds of smokeless powder packed in boxes or less powder in the form of separate loading propelling charges (U.S. Ordnance Department 1941). This magazine type exhibits similar construction characteristics to the standard ammunition magazines. Each building has a concrete foundation with concrete footings that support steel frames encased in structural clay tile. The walls are constructed of ridged 8-inch structural clay tiles. The gable roofs are steel frame and sheathed with corrugated transite. Each roof features a copper roof ridge, metal ventilators, and lightning protection. The long elevations contain six openings that are covered by steel doors with fixed screen louvers; the doors slide along rails attached to the exterior of the building. Typically, the magazine interiors are characterized by unobstructed open space. Typical alterations to the magazines include infilled door openings, replacement doors, and alterations to roofing materials and vents.

Buildings E5850, E5868, E5870, E5872, E5874, and E5876 are one-story, two-bay, standard explosives magazines. These buildings measure 27 x 43 feet and were designed to store bulk explosives, such as black powder, TNT, tetryl, and explosive D (U.S. Ordnance Department 1941). This magazine type is similar to the two previously-described magazine types. Each building has a concrete foundation with concrete footings that support steel frames encased in structural clay tile. The walls are constructed of ridged 8-inch structural clay tiles. The gable roofs are steel frame and sheathed with corrugated transite. Each roof features a copper roof ridge, metal ventilators, and lightning rods. Each side elevation has two openings containing steel doors with fixed vent panels; the doors slide along rails attached to the exterior of the building. Typically, the magazine interiors are characterized by unobstructed open space. Typical alterations to the magazines include infilled door openings or replacement doors.

Buildings E5864 and E5866 were constructed in 1941 to store white phosphorus. These one-story buildings feature one-foot thick, poured concrete walls that rest on concrete foundations. Each building measures 209 x 38 feet. Stepped reinforced concrete firewalls extend beyond the roof plane and divide the interior of the building into eight compartments. Each bay along each long elevation is accessed by a solid steel door with quarter-turn latches. Two screen vents punctuate the side wall of each bay on each long elevation. Bell-shaped metal ventilators punctuate the gable roof ridge. The roof is sheathed with composition roll roofing. Each bay historically was linked to an underground water system. The water system was evident on the south elevation of the building by large metal pipes that punctured the exterior wall above the foundation; the water pipes were removed during the ca. 1990 renovations. The release valves for the water line are visible south of the buildings. This system was necessary due to the combustibility of white phosphorus when exposed to air. Both Buildings E5864 and E5866 were renovated ca. 1990 and converted into hazardous materials storehouses. Alterations occurred to doors, venting systems, and roofing materials.

Buildings E5940, E5942, E5944, and E5946 are concrete igloos added to the Ordnance Assembly Plant in 1953. The igloo is a barrel-vaulted structure measuring approximately 81 x 26 feet. The igloo's floor and arched sides and roof are constructed of reinforced concrete. The igloo is bermed with earth on three sides. The front of each igloo is defined by a concrete wall with a central metal door set in a pronounced concrete surround. Each igloo is vented by a metal stack set in a

concrete block stack near the rear of the structure. The design of the igloo directed the force of an explosion upwards, rather than towards adjacent storage facilities. A detached reinforced concrete blast shield with an earthen embankment is located approximately 40 feet southeast of each igloo.

Utilities

Building E5865 is an elevated water storage tank built in 1942 that is located between the two white phosphorus magazines. The 200,000-gallon capacity steel water tank is constructed of riveted steel plates. The tank measures 50 feet in diameter (SciTech 1997). The tank is supported by a four steel legs set on concrete footers. The legs are reinforced by metal struts. A 14-inch pipe connects the base of the elevated tank to the ground. The elevated water storage tank was constructed to store water needed for the deluge system designed to suppress the explosion of white phosphorus in nearby Buildings E5864 and E5866 (SciTech 1997). The underground system of pipes is located south of the buildings, but the system is evidenced by above-ground cut-off valves.

Facility E5956 is an electrical substation located west of the Ordnance Assembly Plant off Station Road. During World War II, this was the main power station for Edgewood Arsenal. Although established during World War II, the substation retains no elements or equipment that date from that time period. The large gravel area is fenced with a modern chain link fence capped with barbed wire. The electrical equipment has been continually modernized and updated since the substation was established. Concrete pads contain modern electrical boxes. Large metal structures support high-tension electrical lines.

Miscellaneous Buildings

Two buildings were constructed ca. 1990 to support the reuse of the former white phosphorus magazines as hazardous waste storehouses. Building E5863 is a one-story, nine-by-two-bay, asymmetrical office building. The wood-frame building rests on a concrete foundation and is clad with vinyl siding. The gable roof is sheathed in composition roll roofing. A single off-center metal door provides access to the building. The windows are vinyl-clad, one-over-one-light units.

Building E5867 is a one-story, one-bay-by-one-bay metal garage with a metal-clad shed roof and a single overhead garage door centered in the front elevation.

Previously-Evaluated Buildings

In 1996, the Maryland Historical Trust (MHT) concurred with the findings that four buildings and structures associated with the Ordnance Assembly Plant were non historic. Buildings E5809 and E5813, constructed in 1951, are small, above-ground, high explosives magazines that measure approximately 10 x 10 feet and are capped with concrete shed roofs. These buildings are located southeast of the ordnance assembly buildings. Building 5880, constructed in 1951, was a flammable materials storehouse that is located off Atkinson Road. Building E5942 is a concrete igloo constructed in 1953. A fifth structure, Facility E5943, also was determined not historic by the MHT. This structure is a small electrical substation installed in 1969 and was not historically part of the complex.

Building E5951, constructed in 1968, is a self-contained general laboratory that was used by the Nuclear Defense Laboratories between 1968 and 1974. This massive, multi-story block building does not reflect the scale, proportion, and construction materials of the surrounding buildings. The laboratory was not associated with the Ordnance Assembly Plant. During an on-going study of Cold War-era resources at Aberdeen Proving Ground, the APG CRM staff evaluated Building E5951 as possessing the qualities of significance for listing in the National Register of Historic Places for its association with the Cold War-era history of Edgewood Area. The MHT concurred with this finding in 1999.

Building #	Historic Building Name	Construction Date	Building Type	Current Use	Property Type	Recommended NR Status
E5664	Warehouse-General Purpose	1941	Storage	Storage	Building	Not Historic
E5800	Office	1941-42	Administration	Office/Lab	Building	Not Historic
E5803	Change House	1951	Administration	Office/Lab	Building	Not Historic
E5809	Magazine	1951	Storage	Storage	Structure	Not Historic-MHT concurred 1996
E5813	Magazine	1951	Storage	Storage	Structure	Not Historic-MHT concurred 1997
E5824	Receiving/Shipping Building	1942	Administration	Storage	Building	Not Historic
E5826	Ordnance Assembly Plant	1941	Industrial	Storage	Building	Not Historic
E5828	Heating Plant/Pipe Shop	1941-1942	Industrial	Utility	Building	Not Historic
E5830	Ordnance Assembly Plant	1941; 1944	Industrial	Administration	Building	Not Historic
E5840	Ordnance Assembly Plant	1942; 1951	Industrial	Storage	Building	Not Historic
E5842	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5844	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5846	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5848	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5850	Magazine	1941	Storage	Storage	Building	Not Historic
E5854	Machine Shop/Maintenance Shop	1944	Industrial	Storage	Building	Not Historic
E5858	Loading Platform	1958	Storage	Storage	Structure	Not Historic
E5860	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5862	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5863	Office	ca. 1990	Administration	Administration	Building	Not Historic
E5864	High Explosives Magazine-WP	1941	Storage	Storage	Building	Not Historic
E5865	Elevated Water Storage Tank	1942	Utility	Utility	Structure	Not Historic
E5866	High Explosives Magazine-WP	1941	Storage	Storage	Building	Not Historic
E5867	Storage	ca. 1990	Storage	Storage	Building	Not Historic
E5868	Magazine	1941	Storage	Storage	Building	Not Historic
E5870	Magazine	1941	Storage	Storage	Building	Not Historic
E5872	Magazine	1941	Storage	Storage	Building	Not Historic
E5874	Magazine	1941	Storage	Storage	Building	Not Historic
E5876	Magazine	1941	Storage	Storage	Building	Not Historic
E5880	Flammable Materials Storage	1951	Storage	Storage	Building	Not Historic-MHT concurred 1996
E5884	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic

Building #	Historic Building Name	Construction Date	Building Type	Current Use	Property Type	Recommended NR Status
E5886	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5888	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5890	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5892	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5894	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5896	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5910	Warehouse-General Purpose	1942	Storage	Storage	Building	Not Historic
E5911	Warehouse-General Purpose	1942	Storage	Storage	Building	Not Historic
E5912	Warehouse-General Purpose	1942	Storage	Storage	Building	Not Historic
E5913	Warehouse-General Purpose	1942	Storage	Storage	Building	Not Historic
E5914	Warehouse-General Purpose	1945	Storage	Storage	Building	Not Historic
E5915	Warehouse-General Purpose	1945	Storage	Storage	Building	Not Historic
E5916	Concrete Loading Platform	1963	Storage	Storage	Structure	Not Historic
E5926	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5928	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5930	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5932	Smokeless Powder Magazine	1941	Storage	Storage	Building	Not Historic
E5936	Standard Ammunition Magazine	1941	Storage	Storage	Building	Not Historic
E5940	Igloo	1953	Storage	Storage	Structure	Not Historic
E5942	Igloo	1953	Storage	Storage	Structure	Not Historic-MHT concurred 1996
E5943	Transformer	1969	Utility	Utility	Structure	Not Historic-MHT concurred 1996
E5944	Igloo	1953	Storage	Storage	Structure	Not Historic
E5946	Igloo	1953	Storage	Storage	Structure	Not Historic
	Laboratory	1968	Laboratory	Laboratory	Building	NR eligible under Cold War context-MHT concurred 1999
E5956	Electric Substation	1941	Utility	Utility	Structure	Not Historic

HA-2049

8. Significance

Inventory No. HA-2049

Period	Areas of Significance	Check and justify below		
__ 1600-1699	__ agriculture	__ economics	__ health/medicine	__ performing arts
__ 1700-1799	__ archeology	__ education	__ industry	__ philosophy
__ 1800-1899	__ architecture	__ engineering	__ invention	__ politics/government
_x_ 1900-1999	__ art	__ entertainment/ recreation	__ landscape architecture	__ religion
__ 2000-	__ commerce		__ law	__ science
	__ communications	__ ethnic heritage	__ literature	__ social history
	__ community planning	__ exploration/ settlement	__ maritime history	__ transportation
	__ conservation		_x_ military	__ other: ____

Specific dates	1941	**Architect/Builder**	US Army Quartermaster Corps
Construction dates	1941-1942, 1953		

Evaluation for:

__x__ National Register __x__ Maryland Register _____ not evaluated

Prepare a one-paragraph summary statement of significance addressing applicable criteria, followed by a narrative discussion of the history of the resource and its context. (For compliance projects, complete evaluation on a DOE Form – see manual.)

The purpose of this Maryland Inventory of Historic Properties (MIHP) form is to document the evaluation of the U.S. Ordnance Assembly Plant at Edgewood Arsenal applying the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]) as part of the ongoing Section 110 responsibilities of the Cultural Resources Management Program at Aberdeen Proving Ground. The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal (HA-2049) was constructed in 1941 as an independent plant to accommodate the expanded activities of the Ordnance Department during protective mobilization period preceding World War II. The role of the Ordnance Department was to finish filled chemical shells produced at Edgewood Arsenal into complete rounds of chemical ammunition. The Ordnance Department operated the plant between 1941 and 1962, when the plant ceased operations as a separate entity and the buildings and structures were integrated into the larger operations of Edgewood Arsenal and, after 1971, Aberdeen Proving Ground.

The appropriate historic context for evaluating the U.S. Army Ordnance Assembly Plant is the *Historic Context for Department of Defense Facilities World War II Permanent Construction* (Whelan et al. 1997). The Ordnance Assembly Plant at Edgewood Arsenal was constructed by the Ordnance Department as part of the first wave of 31 ordnance installations associated with the nationwide military buildup during the protective mobilization period prior to World War II. The Ordnance Assembly Plant exhibits similar construction, design, and materials to other ordnance plants constructed during the period.

While World War II was a crucial event in U.S. history, not all buildings and structures constructed by the military or by civilian contractors during World War II are significant within the historic context of World War II. To evaluate a property as significant within the context of World War II permanent construction, that property must have an important and specific association with World War II (Whelan et al. 1997). The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal does not possess important or specific associations with World War II history under National Register Criterion A. The Ordnance Assembly Plant finished previously-filled chemical shells produced in the chemical production plants at Edgewood Arsenal into live ammunition rounds. The assembling of chemical munitions by the Ordnance Department represented a small percentage of overall U.S. ammunition production and the Ordnance Assembly Plant at Edgewood Arsenal produced the smallest amount of the CWS stockpile. The stockpiles of gas-filled ammunition were not deployed on the battlefield. The conclusion is that the U.S. Army Ordnance Assembly Plant at Edgewood Arsenal was a small installation that did not play an important or specific role in the overall history of World War II ammunition production.

The U.S. Army Ordnance Assembly Plant played a minor support role in the history of the Chemical Warfare Service (CWS) at Edgewood Arsenal and was not associated with the significance of the arsenal as the first and only chemical warfare industrial plant in the United States during the period 1917 to 1941. Within the context of state and local history,

the impacts of the Ordnance Assembly Plant on the state and local economy or society were subsumed by the larger-scale activities and higher employment rates associated with Edgewood Arsenal and nearby Aberdeen Proving Ground.

The buildings and structures that comprise the U.S. Army Ordnance Assembly Plant do not possess the qualities of significance in American architecture for listing in the National Register of Historic Places under Criterion C. The World War II buildings are constructed of structural clay tile and/or brick and do not exhibit significant physical design or construction techniques. The storage facilities utilized standardized plans that were developed during the 1930s by the U.S Army Quartermaster Corps and constructed nationwide between 1938 and 1943.

After the plant ceased operations as an independent plant on 1 January 1963, the individual buildings were adapted to other uses and integrated into the overall operations of Edgewood Arsenal and, later, Aberdeen Proving Ground. The cumulative changes that have occurred over the last forty years have diminished the integrity of setting, feeling, and association of the former Ordnance Assembly Plant area as a separate entity linked historically or aesthetically by plan or physical development. Individual buildings were modified for new uses. The processing equipment was removed from the three ordnance assembly buildings. A few buildings and structures were removed from the area. In 1968, a new multi-story laboratory, Building E5951, was constructed on the western edge of the warehouse area. This large, self-contained, utilitarian, monolithic building is surrounded by fencing and controlled access gates. The massive laboratory building interrupts the regular spacing of the nearby warehouse area and is out of scale with the surrounding warehouses in its design, size, and construction materials. Other changes that have impacted the cohesiveness of the area include the removal of railroad lines throughout the complex, the removal of fencing that defined the former plant as separate from the rest of Edgewood Arsenal, and changes in landscape. The layout of the former plant and the connections between the buildings are no longer visually evident. Thus, the former Ordnance Assembly Plant now reads as part of the larger Edgewood Area, rather than as a separate installation that it was historically between 1941 and 1962.

The U.S. Army Ordnance Assembly Plant has no known associations with the lives of significant people under Criterion B. It is not anticipated that the complex will yield information important to World War II or Cold War historic contexts under Criterion D.

RESOURCE HISTORY

History of U.S. Army Ordnance Assembly Plant, Edgewood Arsenal

The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal was constructed in 1941 as a self-contained, independent installation comprising three industrial buildings, administration, and warehouses to accommodate the expanded activities of the Ordnance Department during the protective mobilization period preceding World War II. The mission of the Ordnance Department from its establishment at Edgewood Arsenal in 1923 until the department's closure in 1962 was to assemble completed rounds of chemical ammunition. The Ordnance Department operated under the Office of the Chief of Ordnance, while Edgewood Arsenal operated under the Chemical Warfare Service (CWS) (Headquarters Edgewood Arsenal GO #8 1942).

Labor in the production of chemically-filled munitions was divided between the Chemical Warfare Service (CWS) and the Ordnance Department. The CWS, as organized following World War I, was responsible for researching chemicals and their uses, for designing munitions, for producing chemicals, and for filling the shells with chemicals at the chemical production plants, which dominated the central core of the installation (Brophy et al. 1959:29). The Ordnance Department supplied the empty shells in a range of calibers to the chemical production plants. The Ordnance Department then took the filled chemical shells and prepared them to become battlefield-ready ammunition. The Ordnance Department added the casing, the burster, and the fuze to finish the chemical ammunition. The casing contained propellant, generally smokeless powder, that launched the shells when fired. Casings were fixed to the small and medium caliber ammunition rounds. The burster was a tube that was placed into the center of the shell and filled with tetryl; the burster ensured that the shell would explode. The fuze was generally a superquick type or a combination of time and superquick type. Superquick fuzes detonated on impact, while the time fuzes were set to detonate at a prescribed number of seconds after firing (Whelan et al. 1997:185-187; Green et al. 1990:371, 361). The Ordnance Department painted and labeled each shell prior to storage and shipment. Labeling included both painting for daytime identification of the round and punched markings, so that a gunner could identify a round by feel (Whelan et al. 1997:186).

Prior to 1941, the Ordnance Department performed its work at Edgewood Arsenal in buildings assigned to it by the CWS. The first ordnance assembly buildingnt at Edgewood Arsenal was established in Building E5158 (Old # 509). Ordnance operations were conducted in that building from 1924 through 15 September 1942. The building contained four conveyor lines of 160 stations each. Initially ordnance work at the arsenal was performed by one ordnance officer assisted by a few civilians. Ammunition rounds assembled during the inter-war period included CN (a type of tear gas) and white phosphorus (WP) grenades, 155mm shells filled with a variety of smokes, and 75mm and 105mm chemical shells (NARA, RG 156, Box A59). Inert materials and loaded ammunition were stored in facilities shared with the Eastern Chemical Warfare Depot. During the protective mobilization period for World War II, the activities of both the Eastern Chemical Warfare Depot and the Ordnance Department required additional buildings and additional space. New facilities for the Eastern Chemical Warfare Depot were constructed on a peninsula east of the arsenal's main industrial area and the new Ordnance Assembly Plant was constructed on 350 acres west of the industrial area.

The new Ordnance Assembly Plant functioned as a separate installation under the Chief of Ordnance, but was attached to the CWS for administrative purposes (*Army Chemical Center News* 1952). The plant was government owned and government operated (GOGO) and was designed as a permanent installation (*Ordnance Assembly Plant* 1955).

During the first half of the twentieth century, the military had two basic construction classifications: permanent, and temporary. The type of construction depended on available funding, the purpose of the construction, and the overall military requirements. Permanent construction, the preferred option in peacetime, was intended for long-term use and was constructed using durable or permanent materials, such as masonry. Permanent construction also was employed when the buildings housed potentially dangerous production processes or stores. Temporary construction was used in times of emergency or mobilization and consisted of wooden-frame buildings, typically built from standardized plans, or modular metal buildings, such as Quonset huts. During World War II, temporary buildings were most often was employed in the construction of the large mobilization training camps, for inert storage buildings, and for administration and personnel support buildings (Whelan et al. 1997).

The Construction Division of the U.S. Army Quartermaster Corps prepared the drawings for the new Ordnance Assembly Plant at Edgewood Arsenal beginning in 1940. The site selected for the new plant was 350 acres of level ground formerly assigned to Fort Hoyle and was used for artillery drill. The official directive establishing the Ordnance Assembly Plant was issued 25 June 1940; the construction contract was awarded 5 August 1940. Construction of the new installation began in September 1940 with a scheduled completion date of 1 September 1941. The anticipated total cost of the new installation was $17,915,506. By 31 May 1941, the new Ordnance Assembly Plant at Edgewood Arsenal had reached 70 per cent completion (War Department 1941). The first ordnance assembly building was completed in August 1941 and was placed in operation in September 1941 (*Ordnance Assembly Plant* 1955; NARA RG 156, Box A59).

The firm of Whitman Requardt & Smith-Engineers, of Baltimore, Maryland, served as general construction contractors for the expansion work at Edgewood Arsenal and had an office at the arsenal (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, building vertical files). This firm worked under the direction of the Construction Division of the Office of the Quartermaster General to complete the ordnance plant. Whitman Requardt & Smith-Engineers, was founded in 1915 and continues to operate under the name of Whitman, Requardt and Associates, LLP. During the first fifty years of practice, the firm specialized in public works projects and was noted for expertise in water and wastewater treatment (Richard Lortz, Whitman, Requardt & Associates, LLP, personal communication 9/22/94). This firm also served as general construction contractors for the Huntsville Arsenal (now Redstone Arsenal) in Alabama and Rocky Mountain Arsenal in Colorado. The construction of the Ordnance Assembly Plant at Edgewood Arsenal also was assisted by Cummins, Riggs Distler & Co., Inc (War Department 1941).

The Ordnance Assembly Plant comprised 44 buildings, including one administration building, three ordnance assembly buildings, 33 magazines, and three igloos. All buildings completed as part of the original construction phase exhibited functional, utilitarian designs and were constructed of permanent materials. The assembly buildings and above-ground storage buildings were steel-frame buildings encased with brick or structural clay tiles. Walls were structural clay tile or brick. The buildings were set on concrete foundations. Corrugated transite (i.e., an asbestos product) was used to sheathe the roofs. Even the administration building was constructed of brick.

As the mobilization effort preceding World War II progressed, the Army actively sought to contain costs where possible. During early 1941, the Army issued a regulation requiring that administration buildings be constructed of temporary materials, primarily wood. Cost cutting measures were implemented at the Ordnance Assembly Plant at Edgewood Arsenal in construction completed in late 1941 and during 1942.

Buildings E5826 and E5830, permanent buildings designed to house the ordnance assembly lines, were placed in service in September and December 1941, respectively. Each building had four self-contained ordnance assembly lines, two in the north end and two in the south end. The central bay of each building contained a cartridge case storage area and a cartridge case primer installation room that was shared among the assembly lines. Each individual line had a powder weighing room, a conveyor/assembly line, an emergency shower and dousing sink, and three explosion rooms. The lines were characterized as straight line facilities with state of the art equipment. The ordnance assembly process was described as follows:

> "Filled shells, hand-trucked in from track side, are placed on carriers on which they are pushed over a roller conveyor from operator to operator, through concrete booths for more dangerous operations, until

completely assembled, pack, and marked, and disposed of down a conveyor to the waiting outgoing car. A minimum of lifting and handling results and production is standardized" (NARA, RG 156, Box A59).

The buildings were lit by rows of windows and clerestories in the monitor roofs. The long elevations housed multiple doorways to provide exits to workers in case of emergency. Men and women's toilet facilities were located in one end of each building.

In October 1942, the Ordnance officer assigned to the Ordnance Assembly Plant reported assembling the following ammunition: 75mm Gun MkII HS (mustard gas), 75mm Gun MkII WP (white phosphorus), 75mm PH M64 WP, 81mm mortar M57 WP, 155mm MKIIA1 Mod 1 HS, and 155mm M105 WP. The mm is the size of the ammunition and the MK designations denote the type of firing gun or mortar. Between October and December 1942, the plant assembled the following ammunition and numbers of completed rounds (CR): 75mm Gun MkII HS (mustard gas) (n=143,605 CR), 75mm Gun MkII WP (white phosphorus) (n=53,411 CR), 75mm Gun MkII HS (n=32,646), 75mm PH M64 WP (n=197,027 CR), 81mm mortar M57 WP (n=106,810 CR), 105mm Howitzer M60 WP (n= 3,485 CR), 155mm MKIIA1 Mod 1 HS (n=50,257), and 155mm M105 WP (n=46,505 CR) (NARA, RG 156 Box A59; EAI Corporation 1991, Building E5830).

Four rows of ammunition storage facilities were located west of the ordnance assembly buildings. The designs of the storage buildings utilized standardized Quartermaster plans developed during the 1930s for general storage and ordnance storage and built nationwide between 1938 and 1943. Ordnance storage comprised ammunition magazines, smokeless powder magazines, explosives magazines, and igloos. These storage buildings housed raw materials used in the ammunition assembly process and were used to store finished ammunition before transfer to depots or shipment to troops. The ammunition storage buildings were widely spaced with 300 to 400 feet between buildings. The building spacing complied with contemporary ordnance storage safety regulations (U.S. Ordnance Department 1941). The building spacing also allowed ease of access. Roadways were constructed along the east elevations of the buildings, while railroad tracks were sited along the west elevations of the buildings. The storage buildings were constructed at grade without elevated loading platforms, as was typical during the first construction projects associated with the buildup for World War II (Grandine 1998).

In November 1941, an act of Congress transferred all Army construction from the Quartermaster Corps to the U.S. Army Corps of Engineers. The architectural drawings for 1942 expansion of selected buildings at the plant were prepared under the auspices of the U.S. Army Corps of Engineers. These additions reflected efforts to reduce construction costs by saving steel and using temporary materials where possible.

The U.S. Army Corps of Engineers designed Building E5840 in 1942. The building originally was used for burstering 155 mm chemical shells (NARA, RG 156, Box A59). The building was constructed by Whitman Requardt & Smith-Engineers (Grandine and Armstrong 1997). Cost cutting measures were incorporated into the design of Building E5840. While the exterior walls were structural clay tile and brick, the roof trusses were bolted wood. The more elaborate monitor roof design was abandoned for a simple gable roof vented by five square, wood-frame, louvered cupolas. By 1944, the building was used for filling fragmentation grenades with EC powder. EC powder is a fast burning double-based propellant containing nitrocellulose and nitroglycerin. Building E5840 served as a grenade filling plant until 1951 (EAI Corporation 1991, Building E5840; NARA RG 156, Box A60).

In 1942, additional inert storage buildings were constructed on the north side of the complex. Buildings E5910, E5911, E5912, and E5913 appeared on a 1942 map of the Edgewood Area (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, 1942 map). The buildings are metal-frame warehouses clad in corrugated transite. Raised concrete loading docks span the length of each building. Two additional warehouses (Buildings E5914 and E5915) for inert storage were constructed by 1945.

At the same time that the Ordnance Assembly Plant was under construction, new facilities were under construction at Edgewood Arsenal to ready the chemical production plants for increased production. The impetus for new Chemical Warfare Service (CWS) facilities during World War II was to increase the amount of chemical ammunition in case toxic gases were used on the battlefield. The United States policy renounced the first use of toxic gases, but reserved the right to retaliate if an enemy used gases. As the war progressed and gas was not deployed, the CWS refocused arsenal production on incendiaries and smoke-filled shells. The Ordnance Department worked to develop effective delivery systems and propellants to disperse the smoke. The Ordnance Department also experimented with bursterless shells. The most useful smoke munitions were shells filled with white phosphorus (WP). While WP munitions had limited screening ability, they were useful in signaling aircraft observers and as a casualty and demoralizing ammunition. When exposed to air, WP produced severe, slow-healing burns (Green et al. 1990:371).

During January 1943, the development of the 60 mm WP smoke shell was nearing standardization and experimental rounds were produced at the Ordnance Assembly Plant at Edgewood Arsenal. By fall 1943, the Ordnance Department developed a WP shell for the 60 mm mortar. Although the initial experimental rounds of this ammunition were assembled at Ordnance Assembly Plant at Edgewood Arsenal, the record suggests that full-scale production was undertaken at another ordnance assembly plant, since production of this ammunition was not reported in 1944. The 60 mm shell was used in both the European and the Pacific war theaters. During 1944, demand increased for WP shells in calibers from 75 mm on up. The WP rifle grenade was adopted by infantrymen. The WP rifle shell was useful in clearing the enemy from trenches, bunkers, and foxholes (Green et al. 1990:371).

The chemical munitions used in combat were reflected in the types and numbers of ammunition assembled at the Ordnance Assembly Plant. In November 1943, the Ordnance Assembly Plant assembled the following types of ammunition: 75mm howitzer M64 semi-fixed shell, smoke and gas; 81mm mortar M57 shell, smoke filled; 105mm howitzer M84 semi-fixed shell, smoke filled; and, 155mm gun M104 and M110 burstered shell, gas filled. Experimentation was under way in the development of rockets and rifle grenades. The ordnance assembly production figures for January-March 1944 included the following: 75mm howitzer M64 WP (n=226,038 CR); 75mm gun M64 WP (n=6,500 CR), 105mm howitzer M84B1, hexachloroethane (HC), a smoke mixture (n=122,056 CR), fragmentation grenade MkIIA1 (n=1,826,159 CR), rifle grenades WP (n=104,711), rockets, 2.36", T26, WP (n=8,846), and rifle grenades filled with color smokes (n=4,852). In addition, the Ordnance Assembly Plant assembled ammunition for the U.S. Navy (type=5"/38 Cal.) (NARA, RG 156 Boxes A59-A60).

The Ordnance Assembly Plant at Edgewood Arsenal was the first ammunition assembly plant completed at a CWS arsenal. This installation carried out the entire ordnance shell assembly program between September 1941 and February 1942, when the Redstone Ordnance Plant in Alabama was opened (*Ordnance Assembly Plant* 1955). The Redstone Ordnance Plant, now known as Redstone Arsenal, finished chemical shells produced at the adjacent CWS Huntsville Arsenal, the second chemical production arsenal that opened in 1942 (Hughes n.d.). Two other chemical arsenals active during World War II included

Rocky Mountain Arsenal in Colorado, also completed in 1942, and Pine Bluff Arsenal in Arkansas, completed in 1943 (Cannan et al. 1996:198).

Staff training to operate the ordnance assembly plants at other chemical arsenals occurred at the Ordnance Assembly Plant at Edgewood Arsenal. During 1942, the work force at the Ordnance Assembly Plant increased from 30 to 1,000 employees. Peak employment at the plant occurred in October 1944, when 17 officers and 2,187 civilian employees were employed. Over three-quarters (n=1,730) of the civilian employees were women (*Ordnance Assembly Plant* 1955).

After Japan surrendered on 2 September 1945, the Ordnance Assembly Plant was placed on standby status and was activated to fill small-scale orders (*Ordnance Assembly Plant* 1955). Activities that occurred at the plant were limited to administrative and maintenance duties. Eighty-eight workers were employed at the plant in December 1950 (*Army Chemical Center News* 1952).

The plant was again activated for ordnance assembly during the Korean Conflict (1950-1953). Activity increased steadily during 1951 as ordnance assembled during World War II and stored at the installation was shipped to supply U.S. forces in the Korean peninsula. As the supply of stock-piled ammunition dwindled, plans were implemented to restart the assembly lines in the three ordnance assembly plants. During February 1951, a contract in the amount of $1,300,000 was issued to rehabilitate the original ordnance assembly buildings and to construct additional buildings. A second contract was issued in April 1951. Work was undertaken by the construction firm of Kirby and McGuire of Baltimore, Maryland (*Army Chemical Center News* 1952). The construction program included a new change house (Building E5803), four concrete igloos (Buildings E5940, E5942, E5944, and E5946), an addition to assembly plant Building E5840, explosives magazines (E5809 and E5813), a new cafeteria (no longer extant), a system of enclosed walkways, and an additional warehouse. By the end of 1951, the Ordnance Assembly Plant employed 400 persons. The plant administrators projected an increase in the number of employees to 1,000 during 1952 (*Army Chemical Center News* 1952).

In December 1954, the Ordnance Assembly Plant employed 188 persons. The plant was classified as a Class II activity under the jurisdiction of the Commanding General, Ordnance Ammunition Command, located in Joliet, Illinois. The plant operated with a plant manager, a budget and fiscal office, a technical office, an administration division, a safety division, an operations division, an inspection division, a production branch, a stores branch, a plant engineering branch, and a quality control branch. The installation incorporated 63 buildings that contained overall 518,358 square feet. The top three classifications of allocated square footage comprised inert storage (228,427 square feet), explosives storage (183,842 square feet), and production operating buildings (71,627 square feet) (*Ordnance Assembly Plant* 1955).

The mission of the Ordnance Assembly Plant as described in 1955 was "to perform operation and maintenance of facilities required for the production and renovation of chemical munitions and related ammunition items, and to perform administrative and service facilities to the extent practicable, and coordinate such other activities as are a responsibility of the Army Chemical Center" (*Ordnance Assembly Plant* 1955). The plant also performed some research and development work as assigned through the Ordnance Department chain of command.

The production facilities remained in three buildings. Each building contained multiple production lines. The production lines were detailed in the *Ordnance Assembly Plant* (1955). Building E5826 contained one conveyor line equipped to

produce grenades, rifle, and smoke shells. Building E5826 also contained two paint spray lines for use in reconditioning activities. Building E5830 contained four mechanized belt conveyors. Line #1 produced WP smoke cartridge and cartridge and canister ammunition for the 57 mm rifle. Line #2 produced WP smoke shells, WP smoke cartridges, and fixed canisters for the 90 mm gun. Line #3 produced WP smoke cartridge for the 75 mm rifle and WP smoke shells for the 76 mm gun. Line #4 produced WP smoke cartridges for the 105 mm rifle and other items. Building E5840 had two production lines. Line #1 produced WP smoke shells for the 60 mm mortar. Line #2 produced WP smoke shells for the 81 mm mortar (*Ordnance Assembly Plant* 1955). Building E5840 had been converted to the WP mortar filling plant in 1951 (EAI Corporation 1991, Building E5840). Work continued in the assembly buildings throughout the late 1950s and into the early 1960s, although at reduced levels.

On 1 January 1963, the Ordnance Assembly Plant was discontinued as a separate installation. The functions, personnel, and equipment were integrated with Edgewood Arsenal (General Orders No. 29-IV 1963). Operations continued in the assembly buildings under the direction of Edgewood Arsenal. Building E5830 was used to assembly binary munitions and Agent GB and VX munitions between the mid 1950s until the mid 1960s. Big Eye munitions were assembled in the building during the mid 1960s. The building was used for Multiple Launch Rocket System between 1982 and 1989. Since 1989, the building has served as storage and administration (EAI Corporation 1991, Building E5830). Building E5840 was used as a munitions assembly building between 1951 and 1969 and a special weapons plant between 1969 and 1975. Between 1975 and 1985, the building was a general purpose laboratory and an indoor test range during 1986-1987. It has been a general purpose storage building since 1987 (EAI Corporation 1991, Building E5840). No World War II ammunition assembly equipment remains in Buildings E5826, E5830, and E5840 (Grandine and Armstrong 1997).

Summary History of Edgewood Arsenal and World War II Ordnance Production

Edgewood Arsenal was established during World War I as the only chemical weapons production facility in the United States. The arsenal was developed in response to the use of chemical weapons on European battlefields. The site of Edgewood Arsenal was selected in December 1917 to occupy the northern section of Gunpowder Neck on the west side of Chesapeake Bay next to Aberdeen Proving Ground (located on Bush Neck). This site offered access to transportation by rail and water and was relatively isolated from population centers at the time of its establishment.

Construction of Edgewood Arsenal began in 1918. Following World War I, Edgewood Arsenal was maintained as a permanent installation at a much reduced level of activity; production facilities were closed. The Chemical Warfare Service (CWS) was established as a separate entity from the Ordnance Department under the National Defense Act of 1920. While the Chief of CWS was located in Washington, D.C., Edgewood Arsenal served as the headquarters for research and development, training, manufacturing, and storage activities for the service. Edgewood Arsenal remained the primary CWS installation until World War II.

Edgewood Arsenal initially was planned as an integrated production line to accommodate the multi-step process of chemical weapons manufacture. The installation included an area for assembling and producing raw materials, an area for chemical production, an area to pack chemicals into shells and prepare the shells as ammunition, and a storage and shipping area for loaded munitions (Goodwin & Associates, Inc. 2001). The center of the installation was dominated by chemical production plants designed to produce chlorine, mustard gas, chlorpicrin, and phosgene, and shell-filling plants to load chemicals into

ammunition shells. A magazine area was located north of the shell-filling area. This area was close to the main line of the Pennsylvania Railroad to accommodate shipping requirements.

The creation of CWS as a separate service in 1920 allowed CWS to focus on the development of chemical agents appropriate for Army use, the production of chemicals, and storage. The Ordnance Department retained the task of making the chemically-filled shells into complete ammunition rounds and was under a separate command structure. During the inter-war era, the CWS assigned buildings to Ordnance Department to perform its duties, which established an ordnance assembly plant in 1923. The Ordnance Department shared storage space with the Eastern Chemical Warfare Depot (1927-1943). The depot's mission was to serve both as a branch depot and a reserve depot that stored and issued supplies for the CWS.

During the 1930s, CWS prepared plans to meet wartime requirements in the event of mobilization. CWS officers discussed the future role of Edgewood Arsenal. In 1936, a five-year program was proposed to renovate the chemical production plants at Edgewood and acquire materiel, such as gas masks. A few of these plans were implemented, but the German invasion of Poland in 1939 allowed funds to be expended on small chemical production units for toxic agents, impregnite, and white phosphorus at Edgewood Arsenal (Brophy et al. 1959:234-237).

Expansion plans during the 1930s also called for the construction of the depot on the Bush River peninsula located between Lauderick and Kings creeks. The proposed boundaries of the depot were delineated in 1931. It was intended that the Bush River project also would accommodate sufficient space for Ordnance Department facilities. In October 1937, a meeting of an Ordnance Board of Officers was held to review the peacetime expansion plans of the depot and requirements of the Ordnance Department. The Ordnance officers were dissatisfied with the extent of the area assigned to them in the Bush River project. They projected that their wartime requirements would require approximately 1,300 acres for assembly and loading plants, plus an additional 1,700 acres as a safety area. These requirements could not be accommodated on the Bush River peninsula. The Ordnance Department had originally been allotted acreage on the west side of Edgewood Arsenal near the San Domingo area. However, a subsequent revision of Edgewood Arsenal's expansion during the event of war retained the San Domingo area as the site of an airfield and reserve cantonment. During the inter-war era, the San Domingo area was part of Fort Hoyle and was used for artillery drill. The Ordnance officers were offered acreage in the extreme northeast area of the installation, north of Lauderick Creek, but the area was rejected as unsuitable. After this meeting, the Ordnance Board of Officers made two recommendations:

> "a. That the Ordnance part of the present Bush River Project be confined to the erection of the necessary magazines for the storage of hazardous materials.
>
> b. That the Ordnance Department be allotted a section of Fort Hoyle now known as the San Domingo Area, this section to be in the vicinity immediately outside of the present Magnolia Gate of Edgewood Arsenal. On this area would be erected the facilities for the peacetime activities of the Ordnance Department, except for the storage of hazardous materials" (War Plans Division 1937).

Thus, the general outlines of the expansion of Edgewood Arsenal and the secondary, subordinate functions of the Ordnance Assembly Plant and the Eastern Chemical Warfare Depot were planned. Actual expansion of these facilities did not begin until the late 1930s.

Beginning in 1939, educational orders were placed with private industry for the production of gas masks. Approximately 80,000 gas masks were procured under this program, and additional storage facilities for CWS supplies were needed. After the fall of France in June 1940, President Roosevelt implemented a partial mobilization program known as the Protective Mobilization Plan (Whelan et al. 1997:37). In June 1940, President Roosevelt signed the Military Appropriations Act of 1941 that authorized major increases in military spending. Preparations for possible war continued to escalate following the passage of the Lend-Lease Act in March 1941. War was declared after the bombing of Pearl Harbor on 7 December 1941.

CWS prepared for the contingency that chemical weapons might be deployed on the battlefield. Initially, efforts were focused on preparations at Edgewood Arsenal, the CWS's only chemical production plant. Between 1 September 1939 and 7 December 1941, $27 million of the CWS budget total appropriated budget of over $64 million were directed towards construction and repair projects at Edgewood Arsenal (Brophy et al. 1959). Construction projects included renovating and upgrading chemical production plants to working order and the addition of new facilities, such as a hospital, new laboratories, new chemical production plants, a headquarters building, an incendiary bomb plant, and the depot expansion (Chemical Corps Association 1948).

CWS funding also was used to construct new chemical arsenals. Edgewood Arsenal's production plants were technologically outdated and acreage available for expansion was too limited to address anticipated wartime requirements. Between 1941 and 1943, CWS established three new arsenals with their attendant ordnance assembly and storage facilities. Construction of the Huntsville/Redstone Arsenal, Alabama, began in 1941, the facility was operational in early 1942. Rocky Mountain Arsenal in Colorado opened in 1942, followed by Pine Bluff Arsenal in Arkansas in 1943 (Cannan et al. 1996). The locations of these arsenals were selected applying criteria established by the Ordnance Department. These facilities were located in the interior of the U.S., away from coastlines and borders to minimize the danger of enemy air raids. The sites also required access to transportation, especially rail lines, and an abundant supply of water. As a result of the site criteria, most of the ammunition production facilities were constructed in the Midwest and Southeast (Whelan et al. 1997). The bulk of chemical production during World War II occurred at these three arsenals.

Throughout the conflict in Europe, the potential for chemical warfare was unknown. President Roosevelt committed the United States not to use chemical weapons offensively, but cautioned that the U.S. would retaliate with chemical weapons if they were used by the Axis powers (i.e., Germany, Italy, or Japan). This policy served as a deterrent. The Axis powers never used chemical weapons on military targets; however, Germany produced vast stores of chemical munitions and nerve gases. These stocks were captured by the Allies in 1945 (Cannan et al. 1996). While chemical warfare was not initiated during World War II, CWS supplied smoke and incendiary munitions for use in combat, as well as protective gear, including clothing and gas masks (Cannan et al. 1996; Whelan et al. 1997).

The role of Edgewood Arsenal in World War II shifted from CWS's primary manufacturing and production installation to administration, research and development, and specialized and experimental tasks (Brophy and Fisher 1959:120). In 1942, the primary administrative subdivisions at Edgewood Arsenal were research and development, arsenal operations, troops and training, the chemical warfare board, the chemical warfare depot, and the ordnance manufacturing and supply activities (Headquarters Edgewood Arsenal GO #8 1942). At Edgewood Arsenal, the industrial plants dominated the main portion of the installation. In this area were located self-contained chemical production plants designed for each individual chemical. Production lines were either housed in one building, or in a series of separate small buildings. The chemicals were poured

into shells at these main plants. The Ordnance Assembly Plant, which finished the chemical shells into completed rounds of ammunition, occupied 350 acres on the west side of the industrial area. As described in 1942, the role of Ordnance Department at Edgewood Arsenal comprised:

> "...the assembly of chemical munitions under Ordnance Department control as directed by the Office of the Chief of Ordnance; the receipt and storage of materials therefore; delivery of the chemical munitions to the Chemical Warfare Service for filling; receipt of the filled munitions from the Chemical Warfare Service and their processing to complete rounds and their processing to complete rounds; delivery of complete rounds ready for shipment to field service stocks at other storage points with interim local storage; receipt of procurement authorities for chemical munitions and the expenditure of incidental funds for operation, including turning over to other agencies such as the Chemical Warfare Service the funds required for their portion of the work" (Headquarters Edgewood Arsenal GO #8 1942).

CWS remained a relatively small program compared to the overall ordnance procurement program. While CWS operated four production arsenals and six chemical warfare depots, the Ordnance Department operated 35 ordnance works that produced propellants and high explosives, 31 ordnance assembly plants that produced completed ammunition rounds, and 24 ammunition depots (Cannan et al. 1996; Whelan et al. 1997). During the protective mobilization period preceding World War II between September 1939 and May 1940, the Ordnance Department received funding appropriations of over $1 trillion of the overall $4.7 trillion appropriated to the War Department (Green et al. 1990:67).

In July 1940, the Ordnance Department contracted for the first new ordnance works to produce smokeless powder; the new installation was government owned and contractor operated (GOCO) (Thomson and Mayo 1991:32). By May 1941, 31 ordnance manufacturing plants (known as the first wave) were under construction, for an estimated total cost of over $468 million (War Department 1941). The most expensive installations generally were the ordnance works, where the materials used in the ammunition were produced. Thirteen ordnance assembly plants, where completed rounds of ammunition were assembled, were under construction; these plants comprised one shell forging plant, three bag loading plants, three small arms ammunition production plants, and six shell-loading plants, one of which was located at Edgewood Arsenal. The total estimated costs of these plants were $232.4 million; the average cost per plant was $17.8 million (War Department 1941).

Individual variations in costs among the installations took into account the size of the installation, the number of loading lines, and the anticipated volume of production. While the Ordnance Assembly Plant at Edgewood Arsenal was estimated to cost $17,915,506, it was modest in scale to other larger ordnance assembly plants. Its 44 buildings occupied 350 acres. Ten ordnance assembly lines were contained in three buildings.

In contrast, Ravenna Ordnance Plant, a GOCO shell loading plant constructed during the first wave, cost $27,043,000. The ordnance plant and the adjacent depot occupied over 21,400 acres. With over 200 buildings, the Ravenna Ordnance Plant contained three separate shell and bomb loading lines, an ammonium nitrate plant, and four separate lines for loading fuzes and boosters. Each line contained multiple buildings to accommodate the various steps in the process (Whelan et al. 1997; McDowell 1941). The building stock at Ravenna is similar in the use of structural clay tile and brick buildings; the storage facilities were the standardized ammunition magazines that were construction across the U.S. and at the Ordnance Assembly Plant at Edgewood Arsenal. In addition, Ravenna Ordnance Plant was a stand-alone installation that required a full complement of support buildings, including administration, barracks, housing, and hospital facilities (Whelan et al. 1997).

The Ordnance Assembly Plant at Edgewood Arsenal, in contrast, was not a stand-alone installation. Electricity and water were shared with the larger installation. The Ordnance Assembly Plant at Edgewood Arsenal also did not need separate medical facilities, or fire or guard protection systems (Cannan et al. 1996; *Ordnance Assembly Plant* 1955).

A second comparison would be between the Ordnance Assembly Plant at Edgewood Arsenal and the Redstone Ordnance Plant that was constructed to finish chemical shells produced at the adjacent Huntsville Arsenal, the second CWS chemical production plant. The production output of Huntsville Arsenal included gel-type incendiaries, mustard gas, phosgene, lewisite, white phosphorus, carbonyl iron, and tear gas, as well the total U.S. supply of colored smoke munitions (Hughes 1991). The Redstone Ordnance Plant in Alabama also was a government-owned, government-operated (GOGO) installation. The Redstone Ordnance Plant was constructed on 4,000 acres as a stand-alone installation that contained two burster loading and assembly lines, two shell-loading lines, 24 inert storage warehouses, 30 igloos, 35 finished ammunition magazines, administration and personnel support buildings including barracks, dormitories, housing, and utilities. A single burster line comprised 15 buildings to house various parts of the process. Most administration and personnel support buildings were temporary construction. The munitions assembled at the Redstone Ordnance Plant included 75 mm BE (a type of smoke) shells, 155 mm mustard gas shells (HE), 155 mm white phosphorus shells (WP), 81 mm WP mortars, 30 lb and 100 lb chemical bombs, and the production of all bursters for chemical shells and bombs. In addition, Redstone Ordnance Plant assembled colored smoke (green, red, yellow, violet) munitions that were produced at the adjacent Huntsville Arsenal. Production at the plant essentially ceased on 17 August 1945 (NARA RG156 Redstone Arsenal). The operations at Redstone Ordnance Plant soon overtook the operations at of the Ordnance Assembly Plant at Edgewood Arsenal. Between March 1942 and September 1945, over 45.2 million units of ammunition were loaded and assembled for shipment at the Redstone Ordnance Plant (Hughes 1991).

As a comparison, the total ammunition production in the U.S. between January 1940 until VJ Day (15 August 1945) including chemical and regular rounds, comprised 574 million rounds of minor-caliber ammunition (20 mm, 37 mm, and 40 mm); 222 million rounds of medium-caliber ammunition (57 mm-105 mm); 29 million rounds of major-caliber ammunition (4-5 inch to 240 mm); 76 rounds of mortar ammunition (60 mm and 81 mm); 90 million grenades; 26 million mines; 45 million signals and flares; 21 million practice bombs; and, approximately 4.5 million tons of various types of high-explosive, chemical, and armor-piercing bombs (Campbell 1946:252). No total production figures have been located to date for the Ordnance Assembly Plant at Edgewood Arsenal. However, based on the sample production figures quoted above, the overall numbers of ammunition produced at the Ordnance Assembly Plant at Edgewood Arsenal was a small portion of these totals (NARA, RG 156, Boxes A59-A60).

The buildings and the layout of the Ordnance Assembly Plant at Edgewood Arsenal shared similar characteristics with World War II-era ordnance plants and with ordnance storage depots constructed throughout the United States during the protection mobilization period prior to World War II. The layout of the plant grouped the administration and the assembly buildings in close proximity, since the assembly buildings contained relatively non-volatile processes. Most of the acreage of the plant was occupied by widely-spaced ammunition storage buildings. The ammunition storage buildings at the Ordnance Assembly Plant were similar to those facilities constructed at the Eastern Chemical Warfare Depot completed by September 1941 and at other ammunition storage depots constructed across the United States. The primary building materials were structural clay tile walls set on concrete slabs. The magazines represented standardized above-ground magazines issued by the Quartermaster Corps that were constructed at many ammunition manufacturing plants, shell-loading

plants, and depots during World War II (Grandine and Cannan 1995). The plans for these standard magazine types were developed during the inter-war era and were described in the *Ordnance Safety Manual* O.O. Form No. 7224 dated 1 December 1941. The layout of the storage area attached to the Ordnance Assembly Plant was utilitarian and functional. The distances between the above-ground magazines were the standard distances specified by the Ordnance Department during the inter-war era and published in the *Ordnance Safety Manual* O.O. Form No. 7224 dated 1 December 1941.

Following World War II, the Army entered a period of reorganization. CWS was demobilized, but a vigorous support for the role of chemical warfare ensured its permanent existence. In 1946, the Army redesignated CWS as the Chemical Corps, and Edgewood Arsenal was renamed the Army Chemical Center. The role of chemical warfare was a hotly debated topic throughout the Cold War era. During the Cold War era, Edgewood Arsenal served as the national center for chemical warfare materiel development and testing and medical activities. Minor missions included wholesale logistical operations and activities undertaken by other departments and non-Army agencies located on the property (USAEC 1997). The Ordnance Assembly Plant continued under the Ordnance Department as a separate installation. It was active during the 1950s and closed as a separate installation on 1 January 1963.

In 1962, the Army's technical services, including the Ordnance Corps and the Chemical Corps, were disbanded, and the Army Materiel Command (AMC) was established. This new command consolidated logistical functions to ensure integrated materiel management, including new product development, management of materiel stockpiles, testing, and technical and maintenance support. Since 1963, the former U.S. Army Ordnance Assembly Plant at Edgewood Arsenal has ceased to function as a separate, integrated entity. The individual buildings have been adapted to other uses as required by the overall operations of Edgewood Arsenal. In 1971, Aberdeen Proving Ground and Edgewood Arsenal were joined administratively into a single installation (Smart 1994; USAEC 1997).

Evaluation

The purpose of this Maryland Inventory of Historic Properties (MIHP) form is to document the evaluation of the U.S. Ordnance Assembly Plant at Edgewood Arsenal applying the National Register Criteria for Evaluation (36 CFR 60.4 [a-d]) as part of the ongoing Section 110 responsibilities of the Cultural Resources Management Program at Aberdeen Proving Ground. The APG Integrated Cultural Resource Management Plan (ICRMP) identified this area of Edgewood Arsenal as requiring further study and assessment as two possible districts. All buildings in the area lack individual distinction (RCGA, Inc., 1993, 1996, 2001).

The U.S. Ordnance Assembly Plant at Edgewood Arsenal was constructed by the Ordnance Department in 1941-1942 as part of the nationwide military construction program during the protective mobilization period preceding World War II (Whelan et al. 1997). The majority of the building stock is permanent masonry construction. Of the 55 resources in the area, 41 were constructed during World War II, while 8 buildings and structures were added to the complex between 1951 and 1953. The Ordnance Assembly Plant was most active during World War II (1941-1945); a secondary period of activity during the Korean Conflict (1951-1953). During the remainder of the time, the plant was either on standby or on caretaker status. Occasionally, one of the ordnance assembly buildings was activated to fill small or specialty orders. The Ordnance Assembly Plant ceased to be a independent production facility on 1 January 1963 and the complex was no longer operated as an integrated complex. Individual buildings were reused in accordance with the overall operation

requirements of Edgewood Arsenal and, after 1971, Aberdeen Proving Ground. Thus, the period for evaluation of the plant is 1941-1962, during which time the plant operated as a separate entity under the Ordnance Department at Edgewood Arsenal.

On the national level, the appropriate historic context for evaluating the U.S. Army Ordnance Assembly Plant is the *Historic Context for Department of Defense Facilities World War II Permanent Construction* (Whelan et al. 1997). The Ordnance Assembly Plant at Edgewood Arsenal was constructed by the Ordnance Department as part of the first wave of 31 ordnance installations associated with the nationwide military buildup during the protective mobilization period prior to World War II. The Ordnance Assembly Plant exhibits similar construction, design, and materials to other ordnance plants constructed during the period, irrespective of whether the installation was government-owned, contractor-operated (GOCO) or government-owned, government-operated (GOGO). The Ordnance Assembly Plant at Edgewood Arsenal was a small installation in comparison to other ordnance installations. At most other ordnance assembly plants, a single production line was contained in multiple-building complexes. At the Ordnance Assembly Plant at Edgewood Arsenal, multiple short ordnance assembly lines were housed in one building. The exterior design of the ordnance assembly buildings did not reflect a single industrial process, but the processes were adapted to various kinds of ammunition finishing, as needed. No evidence of the industrial processes survives in the ordnance assembly buildings. The designs used for the above-ground ammunition warehouses and igloos were standardized plans used for storage facilities at all ordnance installations and depots. During World War II, the Ordnance Department operated 35 ordnance works that produced propellants and high explosives, 31 ordnance assembly plants that produced completed ammunition rounds, and 24 ammunition storage depots across the United States.

The *Historic Context for Department of Defense Facilities World War II Permanent Construction* (Whelan et al. 1997) outlined an approach for the evaluation of permanent World War II construction. World War II was a crucial event in U.S. history, but not all buildings and structures constructed by the military or by civilian contractors during World War II are significant within the historic context of World War II. Military construction typically was planned and executed as part of a national defense program that expended billions of dollars in the construction of thousands of facilities. To evaluate a property as significant within the context of World War II permanent construction, that property must have an important and specific association with World War II (Whelan et al. 1997).

The U.S. Army Ordnance Assembly Plant at Edgewood Arsenal does not possess important or specific associations with World War II history under National Register Criterion A. The role of the Ordnance Assembly Plant was to finish previously-filled chemical shells produced in the chemical production plants at Edgewood Arsenal into live ammunition rounds. The plant was not associated with the production of chemicals, but with finishing the chemical shells through the addition of propellants, bursters, and fuzes. The assembling of chemical munitions by the Ordnance Department represented a small percentage of overall U.S. ammunition production and the Ordnance Assembly Plant at Edgewood Arsenal produced the smallest amount of the CWS stockpile. The stockpiles of gas-filled ammunition were not deployed on the battlefield, but they served as a deterrent to enemy use of chemical weapons. The conclusion is that the U.S. Army Ordnance Assembly Plant at Edgewood Arsenal was a small installation that did not play an important or specific role in the overall history of World War II ammunition production.

The U.S. Army Ordnance Assembly Plant played a minor support role in the history of the Chemical Warfare Service (CWS) at Edgewood Arsenal. Between 1923 and 1962, the Ordnance Department operated as a separate command in buildings located on arsenal property; however, the department was not under the direct command of the Chemical Warfare Service (CWS). Historically, the importance of Edgewood Arsenal is its history as the first and only chemical warfare industrial plant in the United States during the period 1917 to 1941. During World War I, Edgewood Arsenal functioned as an integrated chemical production line, with receiving and production areas for raw materials, industrial plants to produce chemicals, and shell-loading plants to prepare chemical ammunition. By World War II, chemical production at Edgewood Arsenal was contained in individual buildings or small complexes of buildings dedicated to the production of specific chemicals. Between 1941 and 1943, the production of chemicals in bulk was shifted to the three large chemical arsenals constructed in other parts of the U.S. Edgewood Arsenal became the center for specialized and experimental tasks, such as the establishment of pilot plants to test new chemicals, smokes, and new production processes. The significant history of Edgewood Arsenal is embodied in the industrial plants and the research laboratories that occupy the central core of the installation. The Ordnance Department played no role in the production of chemicals or in filling chemical shells. Thus, the U.S. Army Ordnance Assembly Plant was associated in only subordinate way to the principal missions at Edgewood Arsenal.

Within the context of state and local history, the U.S. Army Ordnance Assembly Plant was located within the boundaries of Edgewood Arsenal. The impact of the Ordnance Assembly Plant on the state and local economy or society were subsumed by the larger-scale activities and higher employment rates associated with Edgewood Arsenal and nearby Aberdeen Proving Ground.

The buildings and structures that comprise the U.S. Army Ordnance Assembly Plant do not possess the qualities of significance in American architecture for listing in the National Register of Historic Places. The World War II buildings constructed for the Ordnance Assembly Plant included an administration building, three ordnance assembly buildings, inert storage buildings, and a complement of magazines to store high explosives, smokeless powder, standard ammunition, and white phosphorus. The buildings are constructed of structural clay tile and/or brick and do not exhibit significant physical design or construction techniques. The storage facilities utilized standardized plans that were developed during the 1930s by the U.S Army Quartermaster Corps and constructed nationwide between 1938 and 1943. Their construction at the U.S. Army Ordnance Plant at Edgewood Arsenal did not illustrate the adaptation of new engineering technologies or new construction materials. The buildings types were not unique for GOCO or GOGO installations or for the assembling of chemical munitions. The building types were found throughout the Army building inventory at ordnance depots, ordnance plants, ordnance works, CWS arsenals, and CWS depots.

The U.S. Army Ordnance Plant ceased operations as an independent plant on 1 January 1963. The individual buildings were adapted to other uses and integrated into the overall operations of Edgewood Arsenal and, later, Aberdeen Proving Ground. The cumulative changes that have occurred over the last forty years have diminished the integrity of setting, feeling, and association of the former Ordnance Assembly Plant area as a separate entity linked historically or aesthetically by plan or physical development. Individual buildings were modified for new uses. The integrity of the design of the administrative building (Building E5800) has been compromised by a 1990s addition that altered the ground plan of the building. The three ordnance assembly buildings (Building E5826, E5830, and E5840) have no original World War II ordnance assembly equipment and no evidence of the industrial processes that once occurred in the buildings. A few

buildings and structures were removed from the area, including the World War II igloos, a few ordnance storage buildings, and the temporary personnel support buildings. In 1968, a new multi-story laboratory, Building E5951, was constructed on the western edge of the warehouse area. This large, self-contained, utilitarian, monolithic building is surrounded by fencing and controlled access gates. The massive laboratory building interrupts the regular spacing of the nearby warehouse area and is out of scale with the surrounding warehouses in its design, size, and construction materials.

Other changes that have impacted the cohesiveness of the area include the removal of railroad lines throughout the complex, the removal of fencing that defined the former plant as separate from the rest of Edgewood Arsenal, and changes in landscape. Historic photographs dated 1941-1942 depicted the former Ordnance Assembly Plant as clear of vegetation so that all components of the complex were visually linked and the layout of the Ordnance Assembly Plant was clear. The layout of the former plant and the connections between the buildings are no longer visually evident. Thus, the former Ordnance Assembly Plant now reads as part of the larger Edgewood Area, rather than as a separate installation that it was historically between 1941 and 1962.

The U.S. Army Ordnance Assembly Plant has no known associations with the lives of significant people under Criterion B. It is not anticipated that the complex will yield information important to World War II or Cold War historic contexts under Criterion D.

9. Major Bibliographical References

Inventory No. HA-2049

Aberdeen Proving Ground, Directorate of Public Works
Real property records, drawings files.

Army Chemical Center News
1952 "ACC's Ordnance Assembly Plant Triples Its Employees in 1951." [January]. On file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

10. Geographical Data

Acreage of surveyed property	approx. 350 acres		
Acreage of historical setting	approx. 350 acres		
Quadrangle name	Edgewood, MD	Quadrangle scale:	1:24,000

Verbal boundary description and justification

The former U.S. Army Ordnance Assembly Plant occupied the western section of Edgewood Arsenal between 1941 and 1962. The plant was discontinued as a separate entity on 1 January 1963 and the buildings have been reintegrated into the overall operations of the Edgewood Ares.

11. Form Prepared by

name/title	Katherine Grandine, Senior Historian/Senior Project Manager		
organization	R. Christopher Goodwin & Associates, Inc.	date	April 2004
street & number	241 E. 4th Street, Suite 100	telephone	301-694-0428
city or town	Frederick	state	MD

The Maryland Inventory of Historic Properties was officially created by an Act of the Maryland Legislature to be found in the Annotated Code of Maryland, Article 41, Section 181 KA, 1974 supplement.

The survey and inventory are being prepared for information and record purposes only and do not constitute any infringement of individual property rights.

return to: Maryland Historical Trust
DHCD/DHCP
100 Community Place
Crownsville, MD 21032-2023
410-514-7600

Maryland Historical Trust
Maryland Inventory of
Historic Properties Form

Inventory No. HA-2049

U.S. Army Ordnance Assembly Plant, Edgewood Area, Aberdeen Proving Ground
Harford County, Maryland
Continuation Sheet

Number 9 Page 1

Brophy, Leo P., and George J.B. Fisher
1959 *The Chemical Warfare Service: Organizing For War*. Office of the Chief of Military History, Department of the Army, Washington, D.C.

Brophy, Leo P., Wyndham D. Miles, and Rexmond C. Cochrane
1959 *The Chemical Warfare Service: From Laboratory to Field*. Office of the Chief of Military History, Department of the Army, Washington, D.C.

Cannan, Deborah, Leo Hirrel, Hugh B. McAloon, and Brooke V. Best
1996 *Historic Context for the Army Materiel Command's World War II Facilities*. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, for the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

Campbell, Levin H.
1946 *The Industry-Ordnance Team*. Whittlesey House, McGraw-Hill Book Company, New York.

Chemical Corps Association
1948 *The Chemical Warfare Service in World War II*. Reinhold Publishing Corporation, New York, NY.

EAI Corporation
1991 Record Search and Assessment for Edgewood Area Buildings. Multi-year, multi-volume study. Prepared for U.S. Army Chemical Research, Development and Engineering Center, APG, by EAI Corporation, Abingdon, Maryland, under contract DAAA15-87-D-0021. On file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

General Orders No. 29
1963 IV-Ordnance Assembly Plant. Issued by Headquarters, Department of the Army, Washington, D.C., 3 July 1963. On file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

Goodwin, R. Christopher, and Associates, Inc.
1993 *Aberdeen Proving Ground Integrated Cultural Resource Management Plan*. Revised draft. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, in conjunction with the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

1996 *Aberdeen Proving Ground Integrated Cultural Resource Management Plan*. Revised draft. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, in conjunction with the Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia.

2001 *Aberdeen Proving Ground Integrated Cultural Resources Management Plan.* Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, in conjunction with the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

Grandine, Katherine
1998 Chemical Area Storage Yard (CASY), Aberdeen Proving Ground, Edgewood Area MHT Historic Properties Inventory Form. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, for Aberdeen Proving Ground, Environmental Conservation and Restoration Division and Dynamac Corporation.

Grandine, Katherine, and Jane Armstrong
1997 *Object Inventory, Edgewood Area, Aberdeen Proving Ground, Summary Report.* Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, on behalf of the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

Grandine, Katherine, and Deborah Cannan
1995 *Support and Utility Structures and Facilities (1917-1946) Overview, Inventory, and Treatment Plan.* Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, on behalf of the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

Green, Constance McLaughlin, Harry C. Thomson, and Peter C. Roots
1990 *The Ordnance Department: Planning Munitions for War.* U.S. Army in World War II Series: The Technical Services, Center of Military History, U.S. Government Printing Office, Washington, D.C.

Headquarters Edgewood Arsenal
1942 General Orders No. 8. 20 April. On file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

Historic American Buildings Survey/Historic American Engineering Record
1982 HABS/HAER Inventory records on file at the Cultural Resources Management Office, Building 5650, DSHE, Aberdeen Area.

Hughes, Dr. Kaylene
n.d. "Redstone Arsenal Complex Chronology, Part I: The Pre-Missile Era 1941-1949. Available at website www.redstone.army.mil. Viewed January 2004.

1991 "Two 'Arsenals of Democracy': Huntsville's World War II Army Architectural Legacy." Available at website www.redstone.army.mil. Viewed January 2004.

Lortz, Richard
1994 Requardt & Associates, personal communication 9/22/94.

McDowell, Lorraine L., editor
1941 *Building the Ravenna Ordnance Plant: A Job History*. The Hunkin Conkey Construction Company, Cleveland, Ohio.

National Archives and Records Administration
n.d. Record Group 77, Entry 391, Boxes 93-96: Edgewood Arsenal. College Park, Maryland.
n.d. Record Group 77, Entry 393: Edgewood Arsenal. College Park, Maryland.
n.d. Record Group 156, Entry 646, Boxes A157-A159: Redstone Arsenal. College Park, Maryland.
n.d. Record Group 156, Entry 646, Boxes A59-A60: Edgewood Arsenal. College Park, Maryland.

Ordnance Assembly Plant
1955 Information Guide prepared by the Army Chemical Center, Edgewood Arsenal, Maryland. On file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

SciTech Services, Inc.
1997 *Abandoned APG Buildings Post-Wide Historical Record Search Report*. Prepared by SciTech. On file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

Smart, Jeffrey K., Command Historian
1994 *U.S. Army Chemical and Biological Defense Command Historical Highlights*. U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

Thomson, Harry C., and Lida Mayo
1990 *The Ordnance Department: Procurement and Supply*. Center of Military History, U.S. Army, Washington, D.C.

U.S. Army Corps of Engineers
1942 Construction Data.

U.S. Army Environmental Center
1997 *Thematic Study and Guidelines: Identification and Evaluation of U.S. Army Cold War Era Military-Industrial Historic Properties*. USAEC, Edgewood Area, Aberdeen Proving Ground, Maryland.

1998 *Cultural Resources Management.* Department of the Army, Army Regulation 200-4 and Pamphlet 200-4. USAEC, Edgewood Area, Aberdeen Proving Ground, Maryland.

U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team
n.d. Building vertical files, historic photographs, historic maps. Located in Building E5027, Edgewood Area.

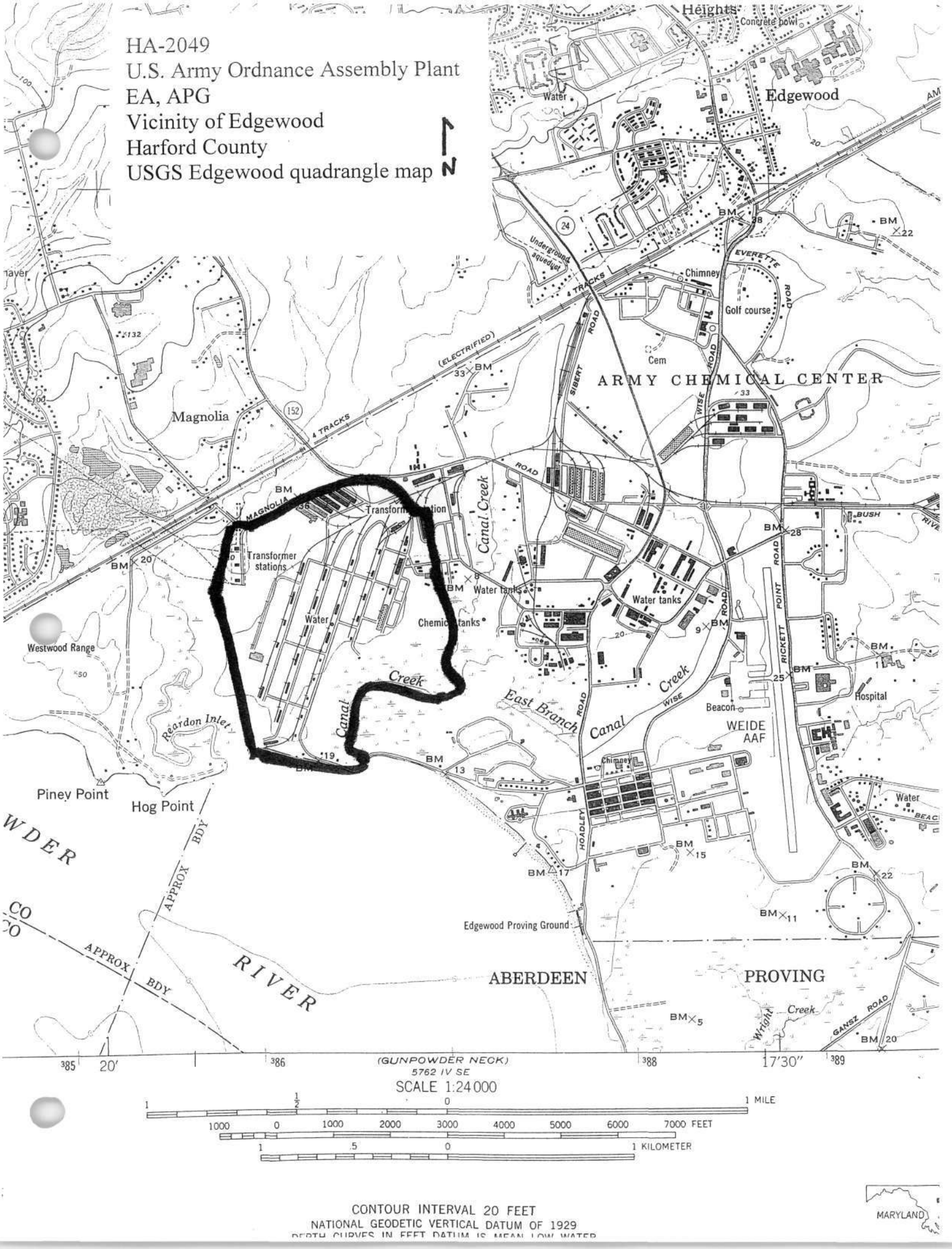
U.S. Ordnance Department
1941 *Ordnance Safety Manual*. O.O. Form No. 7224. U.S. Government Printing Office, Washington, D.C.

War Department, Office of the Quartermaster General, Construction Division
1941 *Construction Progress Report*. 31 May 1941.

War Plans Division
1937 Memorandum with subject: Board of Officers to Consider the Location of Installations of the Ordnance Department. 20 October 1937. CWS 600.1/274, WP 319.2/6. Located in Building E5027, Edgewood Area.

Whelan, Deborah C., Leo Hirrel, William T. Dod, J. Hampton Tucker, and Katherine Grandine
1997 *Historic Context for Department of Defense World War II Permanent Construction*. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, for the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

HA-2049
U.S. Army Ordnance Assembly Plant
EA, APG
Vicinity of Edgewood
Harford County
Resource Sketch Map
No scale available


HA-2049
U.S. Army Ordnance Assembly Plant
EA, APG
Vicinity of Edgewood
Harford County
USGS Edgewood quadrangle map
N
Heights
Concrete bowl
Water
Edgewood
Underground aqueduct
4 TRACKS
EVERETTE ROAD
Chimney
Golf course
(ELECTRIFIED)
SIBERT ROAD
Cem
ARMY CHEMICAL CENTER
WISE ROAD
Magnolia
MAGNOLIA ROAD
Transformer stations
Canal Creek
Water tanks
Chemical tanks
BUSH
RICKETT POINT ROAD
Westwood Range
Reardon Inlet
Creek
Canal
East Branch
Canal Creek
WISE ROAD
Beacon
WEIDE AAF
Hospital
Piney Point
Hog Point
HOADLEY ROAD
Water
WDER
APPROX BDY
APPROX BDY
Edgewood Proving Ground
ABERDEEN PROVING
RIVER
Wright Creek
GANSZ ROAD
385
20'
386
(GUNPOWDER NECK)
5762 IV SE
388
17'30"
389
SCALE 1:24000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
MARYLAND

Maryland Historical Trust Maryland Inventory of Historic Properties Form

Inventory No. HA-2049

U.S. Army Ordnance Assembly Plant, Edgewood Area, Aberdeen Proving Ground, Harford County, Maryland
Continuation Sheet

Number Photo log Page 1

The following information is the same for each photograph:

1. MIHP # HA-2049
2. U.S. Army Ordnance Assembly Plant, Edgewood Area, Aberdeen Proving Ground
3. Harford County, Maryland
4. Mark Gallihue
5. June 2003
6. CRM, DSHE, APG

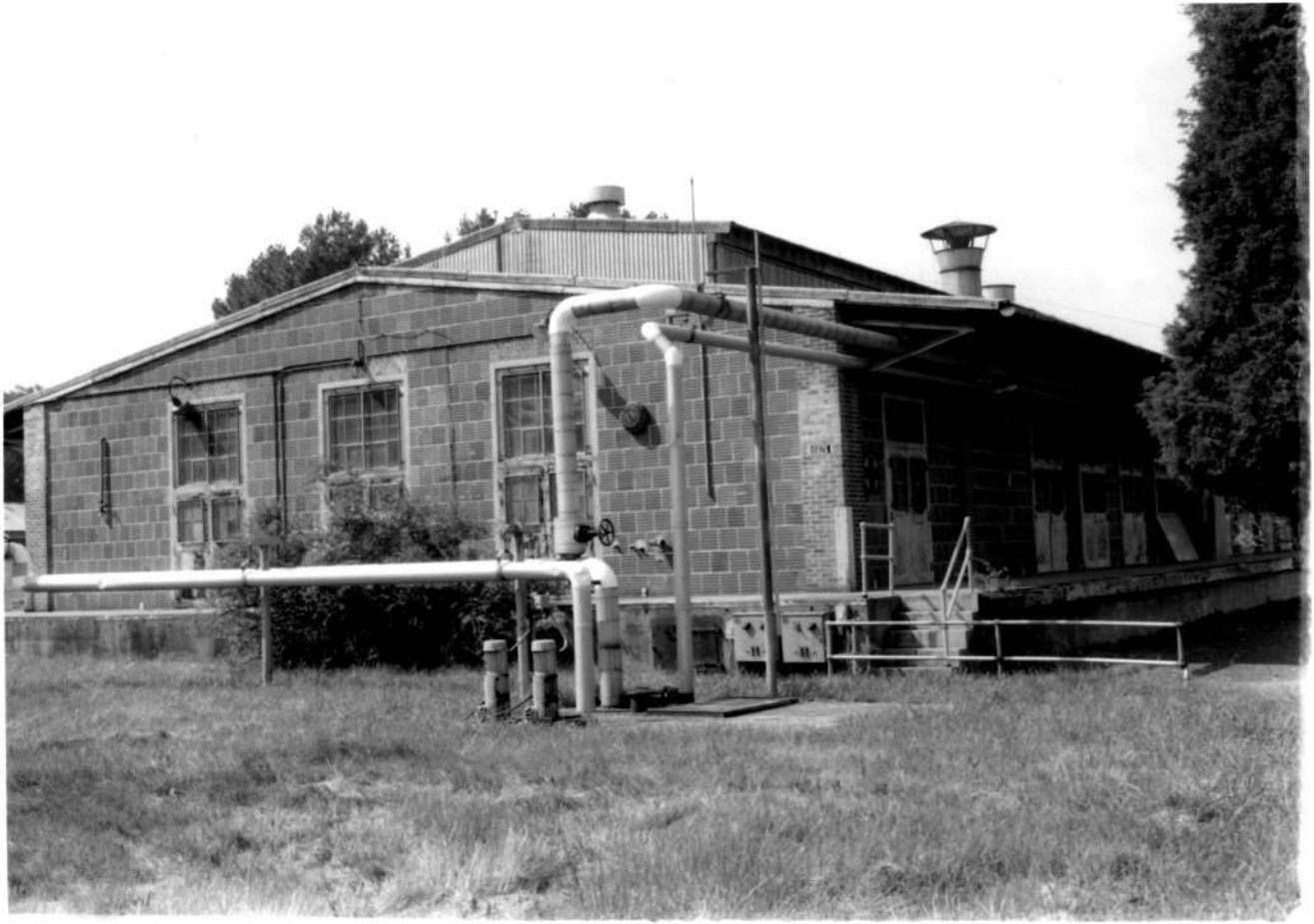
Photo #

1. Building E5800, view looking south.
2. Building E5803, view looking south.
3. Former covered walkways, view looking south.
4. Building E5826, view looking south.
5. Building E5830, view looking north.
6. Building E5840, view looking east.
7. Building E5828, view looking west.
8. Building E5824, view looking southwest.
9. Building E5854, view looking west.
10. Building E5664, view looking northwest.
11. Building E5910, view looking south.
12. Building E5858, view looking south.
13. Building E5836, view looking northwest.
14. Building E5932, view looking northwest.
15. Building E5874, view looking south.
16. Building E5864 with water tower E5865, view looking south.
17. Building E5940, view looking northwest.

HA-2049
US Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CEH, DSHE, APG-
Building E5800, view South
1 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG-
Harford Co. MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Building E5B03, view south
2 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co. MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Former Covered walkways; view south
3 of 17



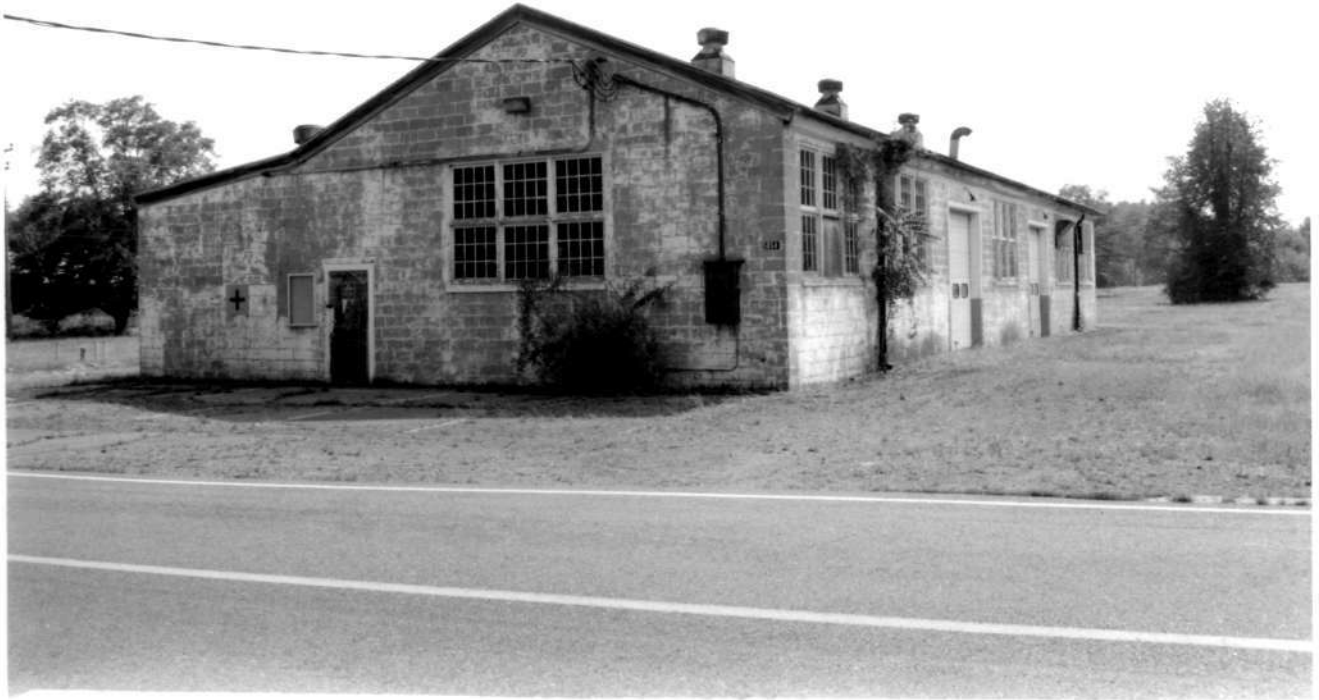
HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG-
Harford Co. MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Building 5826, view south
4 of 17

HA-2049
US Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Building E5830, view north
5 of 17

HA-2049
US Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Building E5840, view east
6 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallibrue
6/2004
CRM, DSHE, APG
Building E5828, view West
7 of 12

HA-2049
US Army Ordnance Assembly Plant, EA, APG-
Harford Co. MD
Mark Gallihue
6/2004
CRM, DSHE, APG-
Bldg E5824, view Southwest
8 of 17



HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG-
Harford Co. MD
Mark Gallihue
6/2004
CRM, DSHE, APG-
Bldg E5854, view west
9 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallibue
6/2004
CRM, DSHE, APG
Bldg E5664, view NW
10 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG-
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG-
Bldg E5910, view south
11 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Bldg. E5858, view South
12 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Bldg E5836, view NW
13 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, GA, APG
Harford Co., MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Bldg E5932, view NW
14 of 17


5174

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Bldg E5874, View South
15 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Bldg E5864, View South
16 of 17

HA-2049
U.S. Army Ordnance Assembly Plant, EA, APG
Harford Co, MD
Mark Gallihue
6/2004
CRM, DSHE, APG
Bldg E5940, View NW
17 of 17